

Guide to fisheries sector studies

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PREPARATION OF THIS DOCUMENT

At the Second Fisheries Development Donor Consultation, Paris, November 1992, FAO was requested to prepare a document providing guidance on the execution of fisheries sector studies. A draft of the document was distributed to donor agencies in early 1994 and their comments invited. This draft was reviewed at the Third Fisheries Development Donor Consultation, Paris, April 1994. Subsequently, additional written comments and suggestions were received by FAO. These comments and suggestions were taken into account in the preparation of the document.

The document is intended to provide guidance to governments sponsoring fisheries sector studies, to other organizations which may be concerned in their commissioning and financing, and to consultancy and other organizations charged with responsibility for undertaking them.

Distribution:

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ABSTRACT

In this document, the fisheries sector is viewed primarily, but not exclusively, from an economic perspective. It suggests that a sector study should assess the material benefits society gains from the fisheries sector and compare these with the human and financial resources employed in the sector. It then suggests a sector study should recommend ways in which the balance of advantage to society can be improved.

The Guide emphasises that a sector study should be a relatively short and readable document. It suggests that the key to a satisfactory study lies in the criteria governing the selection of material. It provides advice on this issue.

The role of a sector study in the sector planning process is described.

Whilst the Guide views the fisheries sector primarily as an economic sector, it is recognized that governments may view the sector as supplying other public benefits apart from a contribution to economic wellbeing.

The Guide emphasises that a sector study should consider unpriiced environmental effects originating outside the sector and impacting upon it, and those generated within the sector which have effects within the sector or elsewhere.

The Guide provides advice to the sponsors of sector studies, notably with regard to the selection of consultants and the preparation of terms of reference. The document also contains advice on the management of sector studies and on the content and presentation of the final report.

CONTENTS

Page

1.	INTRODUCTION	1
2.	PURPOSE AND BOUNDARIES OF SECTOR STUDIES	2
2.1	Purpose	2
2.2	Boundaries of a Sector Study	4
2.3	Summary—Purpose and Boundaries of the Sector Studies	5
3.	SECTOR STUDIES WITHIN THE SECTOR PLANNING PROCESS	6
3.1	Goals, Objectives and Targets	6
3.2	Relationships Between Sector Studies, Strategies and Sector Plans	7
3.3	Fishery Management Strategies and Plans	12
3.4	Coastal Management Strategies and Plans	12
3.5	The Sector Planning Process and National Economic Plans	13
3.6	Sector Studies in the Planning Process—a Summary	13
4.	MAIN COMPONENTS OF A SECTOR STUDY	14
4.1	Stocktaking	15
4.2	Diagnosis	15
4.3	Options for Development	16

5.	CRITERIA FOR THE SELECTION OF INFORMATION AND ANALYSIS	22
5.1	Requirements of the Sponsor	22
5.2	Contribution of the Fisheries Sector to Economic Welfare	22
5.3	Contribution of the Fisheries Sector to Gross National Product	23
5.4	Value Added and Economic Benefits	24
5.5	Considerations Other Than Economic Welfare in the Selection of Information	25
5.6	Summary—Criteria for the Selection of Information and Analysis	26
6.	SOME ISSUES IN FISHERIES SECTOR STUDIES	26
6.1	Fish Resources as Strategic Assets	27
6.2	Sustainable Development	28
6.3	Externalities	31
6.4	Linkages	32
6.5	Technical Aspects	36
6.6	Conflicts Between Interest Groups	36
6.7	Fisheries Authorities	38
6.8	Other Institutions	40
6.9	Legislative Framework	41
6.10	Monitoring and Enforcement of Management Regulations	42
6.11	Research	43
6.12	Social Issues	46
6.13	The Human Resource—Distinctive Capabilities	48
6.14	Industry Structure	50
6.15	Innovation	51
6.16	Privatisation	51
6.17	Food Security	53

6.18	Nutrition	54
6.19	Foreign Exchange	55
6.20	Marketing	56
6.21	Hygiene Standards	58
6.22	Credit	59
6.23	Summary—Some Issues in Sector Studies	60
7.	MANAGEMENT OF SECTOR STUDIES	65
7.1	Sector Study as a Project	65
7.2	Preparation of the Terms of Reference	66
7.3	Selection of the Consultants	67
7.4	Selection of the Team	70
7.5	Management of the Team	71
7.6	Summary—Management of Sector Studies	72
8.	TOOLS	73
8.1	Economic	73
8.2	Socio-economic	75
8.3	Summary—Tools	75
9.	CONSULTATION AND DATA COLLECTION	76
9.1	Consultation	76
9.2	Information Gaps	77
10.	THE REPORT	78
10.1	The Report as a Work of Art	78
10.2	List of Chapter Headings	78
11.	REFERENCES	86

APPENDIX	Example of Terms of Reference	89
<u>List of Boxes</u>		
Box 1	Example of linkages between fisheries sector studies and fisheries development strategies	17
2	Examples of sector study recommendations	20
3	Examples of externalities and integrated coastal area management	33
4	Examples of the investigation of production functions in fisheries sector studies	37
5	Some possible critical areas for fisheries research	44
6	Examples of damage to fishing communities	47
7	Examples of socio-economic information	49
8	Possible areas for innovation in the fisheries the fisheries sector	52
9	The determination of fish prices	57
10	Some problems in the provision of fisheries credit	61
11	Summary of content of the terms of reference for a fisheries sector study	68
Figure 1	A representation of the process of sector planning and implementation	11

1. INTRODUCTION

The purpose of this document is to provide guidance to the sponsors of fisheries sector¹ studies. The sponsor is normally the government of the country concerned. It may also be a technical cooperation agency, a development bank or some other entity working in cooperation with the government.

The document will also guide the executors of such studies—commercial consultancy organizations, multilateral institutions, and others—on the scope of such sector studies and the approach which may be adopted in their commission and execution.

Sector studies will vary greatly from one country to another. In some countries, the management and development of artisanal fisheries may be of paramount importance to governments, whilst in others a critical issue may be over-investment in long-distance fishing. Aquaculture may be highly developed in some countries, with some of the environmental problems which are associated with intensive aquaculture practice, whilst in others governments may be seeking ways to establish a sound aquaculture subsector. It is evidently not possible to provide, in a single document, detailed advice on the information which should be selected and the issues which

¹ In this Guide, "fisheries sector" and "fish industry" are used interchangeably to denote the entire system for the production and distribution of fish. The normal definition of "industry" is a group of firms associated by common technology or supply or distribution channels (Kay, 1993). In many important respects, aquaculture and fish capture belong to different "industries", because much of the fundamental technology differs. However, there are enough similarities, certainly in distribution and marketing, and at the margins, in production, to justify considering them together as one industry.

should be considered. Instead, this Guide seeks to establish the common principles which should underlie any fisheries sector study.

Reference is made in this document to the need for a sector study team to consider unpriced environmental effects which have their origin outside the sector but have an impact upon it, and those which have their origin within the sector. In this connection, readers are referred to a document "Agriculture, Forestry and Fisheries within Integrated Coastal Management" (provisional title) currently in preparation and to be published by FAO in 1995.

2. PURPOSE AND BOUNDARIES OF SECTOR STUDIES

2.1 Purpose

The principal purpose of a sector study is to provide a coherent and concise appraisal of the fisheries sector. It describes the sector, analyses its problems and opportunities, and presents options for its development.

A sector study is primarily, but not exclusively, an economic document. It is concerned with the contribution of the fisheries sector to national economic welfare. The use of the term "welfare" in the document follows conventional usage and refers to the highest possible level of material welfare for the consumers of a society, net of nuisance outputs (or

externalities²⁾ and adding in unreported and non-market incomes.

A sector study can also be thought of as an examination, in depth, of the supply and demand for fish. On the demand side, it analyses the domestic and export markets for fish and fish products. On the supply side, it examines the factors underlying the supply of fish. These are extremely diverse. They include biological, technological, institutional, social and economic considerations. Through the analysis of the supply and demand for fish and fish products, a sector study aims to present the development options of how a country can make the best possible use of its fish resources³.

To say that sector studies are economic documents does not mean that the analysis is exclusively economic, as indicated by the factors which constrain supply, referred to above. The unifying theme of a sector study is the examination of the

² Externalities are changes generated by an agent and having an impact elsewhere other than through the price mechanism. Examples: a fisherman entering a fully exploited fishery generates a resource cost, or an "externality" on existing users by bringing about an increase in their operating and/or a fall in their revenues; a factory discharging an effluent which kills fish imposes a cost, or externality, on fishermen through their foregone revenues. A fuller treatment of externalities is given in section 6.3.

³ In economics, the term "resource" is used to denote any input (also known as a factor of production), used to produce outputs. A subset of resources are natural resources which are raw materials provided by nature. These include renewable natural resources, such as fish and timber, and non-renewable natural resources, such as minerals. Whilst labour, and ultimately machines (the other factors of production) are also ultimately products of the natural world, natural resources are generally distinguished from these on the ground that their management presents special problems.

economic resources that society puts into the sector compared to what it gets out. To examine these, studies must be wide ranging and cover all relevant aspects of the industry. The role of institutions of all kinds in facilitating the functioning of the sector must be examined. The relationship between the sector and the environment is important because the industry has an impact upon the environment and is influenced by it. A sector study must also address social concerns. These are often acute in the fisheries sector, not least because excessive fishing leads to low and uncertain earnings for fish producers and population pressure may contribute towards overfishing (Pauly, 1990).

In addition, sector studies should take account of issues which are important to the welfare of communities but not readily susceptible to economic analysis. For example, it may be that a racial, religious, cultural or gender group within the fisheries sector suffers a degree of social discrimination which is a source of public concern. It would be important, in this case, for a sector study to state the facts, analyse the origin of the problem, propose relevant meliorative developmental change and, certainly, take account of the issue in the development options presented in a study.

2.2 Boundaries of a Sector Study

Unless circumstances—such as the requirements of the sponsor—dictate otherwise, a sector study is normally based primarily on currently available (secondary) data complemented by interviews. Usually, the team undertaking a sector study would not be expected to undertake any original research.

The team leader has to maintain a balance between the requirement for information which is essential to arrive at an appraisal of the sector, and that which might be obtained later or cannot be obtained in the time or with the funding available. For example, if analyses of the dynamics of the fish populations

exploited by the country's fleet are not available, a sector study would not normally include one; the data requirements would be too great and the time available for a study would be too short. However, such a study would be expected to recommend further studies of fish populations, if relevant to the country concerned.

This does not mean to say that limited investigations in the field should never be undertaken. However, the budgetary and time implications of using, for example, rapid rural appraisal techniques to seek the views directly of local people, often means that the decision to do so has to be taken when the consultant is preparing the workplan for a study (see also section 9).

As noted above, a sector study deals with the principal economic features of the fisheries sector; it will not usually include detailed economic or other calculations. For example, if a study recommends improved fish-landing facilities for artisanal fishermen, it would not be expected to include a technical and economic feasibility study of a proposed facility.

A sector study will not normally include historical information unless it has a significant bearing on the current status and future potential of the industry.

2.3 Summary—Purpose and Boundaries of Sector Studies

To summarise, a sector study is a readable document which is not unnecessarily long. It should not include information which has little bearing on the overall themes of the document; it concentrates on data which support the main arguments of the study.

A good study of the fisheries sector will:

- offer judgements on sector development policies and suggest ways in which the sector's contribution to development may be enhanced;
- propose an appropriate balance between the roles of the public and private sectors in the development process;
- determine investment priorities in the sector as the first step towards the identification of programmes and projects;
- review the capacity of the institutions in the fisheries' sector to advance its development;
- identify gaps in information or further studies that should be undertaken;
- contribute towards the formulation of development policies and strategies for the country as a whole;
- initiate the planning process.

3. SECTOR STUDIES WITHIN THE SECTOR PLANNING PROCESS

3.1 Goals, Objectives and Targets

A sector study is undertaken within the context of the government's goals for the sector. Goals are statements which are generally too broad to quantify. For example, a goal of a government might be to improve the quality of rural living in order to reduce or even halt rural migration to the cities. Such a goal might also be a goal for the fisheries sector. Another national goal might be to increase the supply of food, both to

the national population and also for export. This goal, also, might apply equally to the fisheries sector.

On the basis of a sector study, the government will be able, within the sector strategy, to refine goals into objectives for the sector. Objectives are more precise statements than goals of what is required from a sector. For example, an objective of a fisheries sector, associated perhaps with the goal of increasing food production, might be to reduce post-harvest wastage. The setting of objectives which are based on the information generated in the sector study will mean that they are compatible with the constraints operating on the sector and the opportunities available to it.

A characteristic of objectives is that they can be quantified as targets. The associated target of an objective to increase food supply might be a reduction of post-harvest wastage in the fisheries sector from 25 percent to 15 percent over a five-year period. In general, a government will only be able to define targets in the formulation of the sector plan when there is the quantification of the available human, financial and other resources to work towards all the objectives which have been determined.

The basis of the sound definition of objectives and targets is good sector study work.

3.2 Relationships Between Sector Studies, Strategies and Sector Plans

It is helpful in understanding how sector study work should be approached to have an understanding of the pivotal role of a sector study in the sector planning process. This section of the Guide, therefore, is a diversion from a sector study itself to place a sector study in the context of the sector planning process.

A sector study is not a sector plan. It does not, therefore, include detailed proposals for projects or policies. Its prime purpose is to provide enough information and analysis for the government to formulate a preferred strategy, or strategies.

There is, however, another important distinction between a sector study, on the one hand, and a strategy and plan, on the other. This is the fact that they call for different levels of responsibility.

A sector study is a document which provides information about the industry, analyses this information, and assembles proposals for the industry's further development. It may be an extremely influential document but it does not commit the government to anything. Reflecting this situation, the preparation of a sector study is often the responsibility of consultants.

In contrast, the strategy and the plan represent commitments by a government to a course of action. Governments, of course, may often seek assistance in preparing a strategy and a plan but government ministers and senior officials can and should take responsibility for setting a strategy for the sector and the subsequent plan.

This arrangement of responsibilities and functions is consistent with organisational theory which states that the process of planning in any institution, such as government, an educational establishment or a commercial enterprise, is layered (Turner, 1993). Top level planning is concerned with strategy, principles and policies, setting out the framework for lower level detailed decisions. More detailed planning of projects and policies takes place at one or more lower levels of responsibility although under the general supervision of senior management. The basic work represented by a sector study—although the work calls for a high level of skill and experience—is at such a lower level of responsibility.

If a sector study process has worked as it should, the sector strategy document will be formulated by the government from the options for development presented in the sector study.

The strategy document reaffirms, or modifies, as may be the case, the sectoral goals, identifies the objectives and sets out the policies to be adopted which will enable the government's objectives to be met. A government may have two or more strategies. For example, there may be strategies for marine and for inland fisheries, or for different regions within the country. Strategies are made up of policies.

(Policies are the grouping of policy instruments—which may consist of legislation and/or regulations, economic instruments, such as financial incentives and/or disincentives, and public investment—to be used to achieve a given objective).

The strategy document should contain an analysis of policy measures to assess their impact both on the specific issue they are intended to address and their more general impact. A sector study team should be aware of this requirement for information in their selection and presentation of information and in the preparation of background working documents.

A strategy provides the basis of the sector development plan. Plans contain detailed proposals including projects, which follow from the chosen direction of change and include estimates of the resources (human and financial) required and the time frame within which specified activities are planned to be undertaken. A plan should not be merely a list of projects.

A plan typically includes detailed proposals for two years, but thereafter is updated—or "rolled-on"—as information on the progress of implementation becomes available and changes in circumstances are taken into account. A strategy, however, is likely to be only slightly modified within a planning period,

unless unforeseen significant changes in circumstances occur during the period.

A sector strategy and plan propose the allocation of resources at the disposal of the public sector. These resources might be quite limited compared to the total size of the fisheries sector. They depend on budgetary allocations and external sources, such as development banks. In most cases, governments cannot decide in detail what non-public sector companies decide to do. However, governments can create an intelligible and viable framework of infrastructure, research, regulation, taxation and other initiatives which will guide the sector. Indeed, given the character of the industry, dependent as it is on a renewable resource, it is imperative that governments take a very clear view of the appropriate sphere of activity of, and role for, the public sector in guiding the rational development of the industry.

Figure 1 is an illustration of the recommended sector planning process.

The welfare objective(s) is/are the driving force which stands at its apex.

A sector study looks at the industry from the point of view of the stated welfare objective and provides options or recommendations which are considered by a sector study team to enable the government to meet its development objectives within the fisheries sector.

The government formulates the sector strategy on the basis of the selected option or recommendations for development.

The sector plan is the detailed working out of the sector strategy.

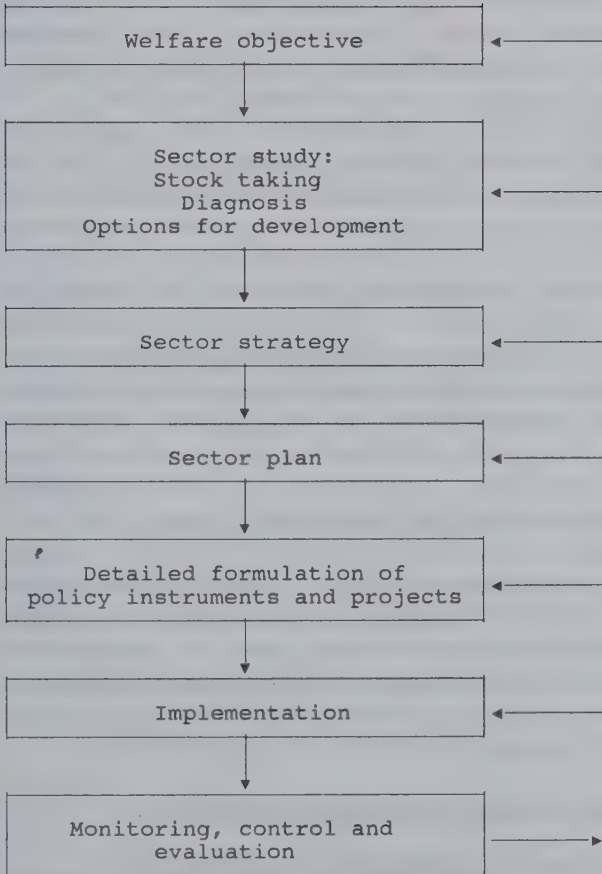


Figure 1 A representation of the process of
sector planning and implementation

However, the plan cannot be implemented directly. It is necessary within the timescale of the plan to formulate and prepare policies and projects in sufficient detail to secure commitment and funding. The sequence in Figure 1 therefore includes detailed formulation of policy instruments and projects.

Implementation is the next stage with programme management, including monitoring, control and evaluation, as the integrating factor, feeding back to all the other stages in the process.

This last point deserves emphasis. The process of planning is always iterative. New information on markets, resources, technology or legislation is always emerging and the alert fisheries department is aware of this. New information may change the basis for any of the stages in the planning process.

3.3 Fishery Management Strategies and Plans

The formulation of fishery resource management strategies and plans lies outside the scope of this Guide although much of the information will be the same. It is sufficient to state here that it will be necessary for sector development strategies and plans to accommodate fishery management interventions.

3.4 Coastal Management Strategies and Plans

Increasingly, governments are recognizing the need to adopt an integrated approach to the management of coastal areas. The fisheries sector is generally far more affected by environmental changes originating outside the fisheries sector than other sectors are by environmental changes generated within the fisheries sector. It is important, therefore, that the fisheries authorities are able to show how fisheries sector plans

are aimed at, *inter alia*, minimizing externalities generated outside the sector and having an effect on it, and externalities arising within the sector and having effects within it and/or outside.

3.5 The Sector Planning Process and National Economic Plans

The goals for the sector will be determined by the government. It may, for example, put a high priority on the creation of sustainable rural employment, and the strategy adopted for the fishery sector will reflect this objective.

In some instances, also, governments will set objectives for the sector and even targets without reference to the fisheries authorities. For example, a government may establish an objective of increased supplies of fish, although fish stocks may already be fully or over exploited with little chance of significant recovery within the planning period. In such cases, it would be desirable for a national development strategy to be revised to take account of significant constraints within the fisheries sector and, perhaps, elsewhere.

3.6 Sector Studies in the Planning Process—a Summary

The sector study documents the following:

- the current state of the industry;
- most probably, the definition or refinement of sectoral objectives;
- the basis of a strategy for achieving those objectives;
- in certain situations, targets.

A sector study should be undertaken having regard to the following sectoral and cross-sectoral considerations:

- many of the information requirements of a sector study are common to those for a fisheries management strategy and coastal area management strategy;
- a sector strategy and subsequent fisheries development plan are complementary to, and should be consistent with, the following:
 - fisheries management strategies and plans;
 - integrated coastal area management strategies and plans;
 - sub-national (if appropriate) and national development plans;
 - the recognition that the sector study is not a sector plan; the latter spells out the policy and project implications of the sector strategy.

4. MAIN COMPONENTS OF A SECTOR STUDY

Each section of a sector study can be considered under the following broad headings:

- sector review, or "stocktaking";
- diagnosis;
- options for development.

A sector study presents a picture of the industry as it is (the stocktaking), analyses its strengths and weaknesses (diagnosis) and then presents the options, or recommendations, for development.

As the team of consultants examines different aspects of the industry, this three-step procedure should be regarded as the basic framework.

4.1 Stocktaking

There will be frequently a significant volume of available information about the fisheries sector. A great deal of it will be irrelevant to a sector study.

A sector study team selects some of the available information for use in the preparation of the report or in its presentation. The principal criterion of selection is the relevance of information to obtaining a sound economic picture of the sector.

The reader of a sector study needs to know what the contribution of the industry is to national economic well-being. Thus, the sector review summarises in clear and unambiguous terms the value of what society puts into the fisheries sector (such as vessels and other fishing inputs, government administration, land and water, the workforce, research establishments, etc.), and the value of what it gets out of the sector in exchange for the resources which it puts into it (such as fish for human consumption, employment and export earnings). Other criteria for inclusion are discussed in section 5.

4.2 Diagnosis

The centre-piece of the sector study is the analysis of the facts selected in the sector review. As the sector study examines the different resources used by industry—financial, human resources, research and administrative inputs—it diagnoses what are the defects in their use and makes recommendations on their improved use.

Another way of expressing this point is that a study analyses how society can get the same outputs and benefits from the sector in exchange for fewer inputs, or more outputs and benefits for the same inputs.

Thus, a diagnosis is a normative exercise in which the strengths and weaknesses of the sector and its opportunities and threats are identified and analysed.

4.3 Options for Development

This section of a sector study is usually a convenient place for the team to review the goals and objectives which have been set for the industry and propose modifications in the light of the evidence available.

Such a statement provides a basis for the options for development. In most cases, the elaboration of the options for development will form the major part of a sector study.

The principal output of a sector study is a statement of the options for development. This statement is the basis of the strategy to be subsequently formulated.

The ways in which statements of options for development are framed will be dependent upon the circumstances. In some cases, two or more broad options, with their attendant policies, designed to meet the government's goals, will be presented for the government to make a choice between them as the basis for its sector strategy. In other cases, a single broad option might be proposed.

The options thus presented will be reinforced with a description of the policies to implement them.

Two illustrative examples are shown in Box 1.

Box 1: Examples of linkages between fisheries sector studies and fisheries development strategies

Example 1: Options for development presenting a choice between options to achieve a specified objective

In a country with increasingly limited opportunities to fish in distant waters, the government may have set itself the goal of not providing public subsidy to support the industry. In this context, a sector study might set out, in broad terms but with as much quantification as possible, the available options.

In the analysis part of the study, the costs and benefits of as many options as possible would be examined. As a result of this analysis, it may be concluded that there are two viable options: first, abandonment of long-distance fishing and, second, scrapping the major part of the fleet and modernization of the balance.

In the section dealing with options for development, the study would outline the different policy instruments which might be adopted under each approach, for example, retraining and job creation schemes, credit for upgrading of vessels, etc.

After careful review of the sector study, the government would then opt, if it wished, for one of the recommended paths. The government's preferred option would be the basis of its strategy.

The preferred option would be the subject of more detailed work in the strategy formulation. Policies would be defined more closely and possible policy instruments would be analysed to determine their likely impact on the sector.

Example 2: A single option for development to meet a stated objective

A study of the fisheries sector of an African country where aquaculture development in the past has not met expectations might set out the options for development. cont.

Box 1: Continued

Example 2 cont.

In its stocktaking of the sector, it may have become clear that aquaculture development efforts in the past had not always been focused in the most appropriate areas and that much effort had been dissipated because of inadequate funds within the Department of Fisheries to provide useful research and an effective extension service.

In its analysis, the study may have identified the key research requirements for different kinds of aquaculture and means of delivering extension services, although it would probably not have been able to do more than arrive at order of magnitude costs and likely level of benefits.

The option for development described by the study may propose that further studies be undertaken and describe a number of ways in which the constraints to aquaculture development could be removed. These might include certain organizational changes in the fisheries department, close cooperation with the Agriculture Department, and a number of others.

The Government would then be able to consider its strategy on the basis of the option presented to it. The means adopted would be further expanded in the government's strategy to include the policy instruments required, including any administrative changes which might be needed. The planning of specific initiatives, conceivably focused in particular regions, would have been unlikely to have been included in any detail in the sector strategy but would form part of the sector plan.

Within the overall option which a government might adopt as the basis of a strategy, a sector study team should provide the government with specific recommendations.

Some brief examples of recommendations are shown in Box 2. In a sector study, of course, the recommendations would be expanded, as far as possible, by an analysis of costs and benefits of the proposed changes, including the foregone benefits of not implementing them – the opportunity costs.

It is usually appropriate for a study to concentrate on a limited number of options which will enable the government to meet its goals, which are realistic and sustainable, and which carry support. Although, as noted above, such options for development represent the views of the sector study team, not those of the government, much time in the future can be saved if the options proposed are discussed thoroughly with appropriate government officers before their finalization.

Nevertheless, it is important, also, that a sector study team should maintain its independence and objectivity. For example, the government of a country with potential for shrimp culture might wish to see the sector study recommend a target figure for an increase in the quantity of farmed shrimp produced. It is likely, however, to be more important that existing shrimp production should be conducted efficiently within an appropriate legislative framework, and that it should make a significant social contribution, and not cause unacceptable damage to the environment. In such cases it would be better if sector studies described the options for development, rather than quantified a particular development path. In any event, even if the sector study was able to identify scope for an increase in farmed shrimp production, it may not be possible to provide a credible estimate of the expected increase in production until specific commercial shrimp farming projects have been prepared.

Similarly, it may not be possible to quantify a government's objectives to reduce post-harvest spoilage until projects have been formulated.

Box 2: Examples of sector study recommendations

Example 1: Monitoring and control of offshore fishing

The system for the monitoring and control of offshore fishing operations is in need of overhaul. A corps of fisheries inspectors under the management of the Fisheries Department should be established. It should have its own career structure, supplemented by a system of regular appraisal. The Fisheries Department should present its proposals to Ministers as a matter of urgency.

Example 2: Quality control of fish exports

As imports into the European Community are subject to hygiene regulations, some changes in fish exporting establishments will be required. It is recommended that consultants be contracted to undertake a review of fish processing standards with a view to presenting recommendations for the quality control of exports and for the training of government quality control inspectors.

Example 3: Consultation with the industry on fisheries management

It is recommended that a formal consultative procedure for fisheries management be introduced. Representatives of the fisheries sector and fishing communities should be invited to a biannual consultation at which the Fisheries Department will table a statement with the likely outlook for fish catches within the subsequent months and years. The criteria for invitations to the consultative meetings should be predetermined and based on conditions designed to ensure that participants at the meetings are representative of a significant section of the sector.

cont.

Box 2: Continued

Example 4: Feasibility study of the expansion of
port infrastructure

Port infrastructure does not meet the current requirements of industrial fishing vessels. It is recommended that a detailed review of requirements be undertaken with a view to assessing the costs and benefits of modernising and expanding facilities.

A sector study team, and particularly the team leader, should have the experience and personality to discuss such issues with the government and arrive at a solution both the government and a sector study team can work towards.

Sector studies have often been associated with long lists of possible interventions and possible projects. The view taken here is that this approach is generally mistaken because the proposed interventions are usually presented without considering how they fit into an overall view of the scope for development. Notably, they rarely take into account the opportunity costs—the cost of foregoing an option—of different development paths.

There are other criticisms of the "shopping list" approach, including the fact that it rarely takes into account institutional capacities, the sequence in which projects should be undertaken, and institutional capacities.

5. CRITERIA FOR THE SELECTION OF INFORMATION AND ANALYSIS

5.1 Requirements of the Sponsor

Any sector study needs a starting point. The team of consultants needs to know the requirements of the sponsor of the study so they can select certain material for presentation and analysis and reject other material as being irrelevant.

One of the first jobs of the team leader, therefore, is to establish the approach which the sponsor wishes the consultants to take.

5.2 The Contribution of the Fisheries Sector to Economic Welfare

The recommendation in this Guide is that the contribution of the sector to economic welfare should be an underlying principle governing the process of selection of material, although, as noted under 2.1, other aspects of the sector may be important.

A sector study identifies the features of the fish industry which make the most contribution to economic, or material, welfare and to ways in which this contribution can be increased. Such an increase will be achieved if more output can be obtained from current inputs or if current output can be produced using fewer inputs, so releasing them for use, when possible, elsewhere in the economy.

The adoption of this principle means that information selected for review and analysis describes features which are of economic importance; sector studies point to aspects of the sector which are likely to have an impact on the lives of many people. Subject to the views of the sponsor, issues approached might be, for example, overfishing in the Exclusive Economic

Zone (EEZ), post-harvest wastage, or institutional capacity. Information selected on each issue will be focused on how the contribution of the sector to economic welfare will be improved.

In contrast, a sector study team will avoid issues which are not of significant economic importance. It would be a mistake, for example, to devote attention to inefficient but relatively small public sector enterprises while giving insufficient attention to issues relating to the environmental management of a large coastal aquaculture industry.

Determining what information is necessary for the proper stocktaking and diagnosis relating to the selected issues is, more than anything, a matter of experience. In dealing with artisanal overfishing, for example, it may be appropriate for the team to seek information on the social status of fisherfolk, ease of entry and exit from the sector, health and educational facilities available to fisherfolk, other employment opportunities, and the attitudes of fisherfolk to certain issues. It would not be appropriate, however, for the team to attempt the collection of information for a feasibility study on the establishment of a co-management system.

5.3 Contribution of the Fisheries Sector to Gross National Product

Governments usually express the main economic objective in terms of the required increase in Gross National Product (GNP) or Gross Domestic Product (GDP), with a preference for GNP because it includes earnings remitted from abroad and excludes earnings sent abroad. If, from one year to another, there is an increase in GNP—or GDP—the working assumption usually is that society's resources are being used more efficiently.

In the fisheries sector—and, indeed, in most natural resource-bases sectors—this may not be so. The measure

captures the value of goods and services generated by the sector and short-term increased landings may add to these. Additional fishing effort, however, may diminish the stock of the country's natural capital, represented by the fish stocks, resulting in longer-term damage to the capacity of the sector to contribute to GNP. Because most fisheries are over-exploited, this will very often be the case.

Economists believe that when this type of situation and other environmental externalities are taken into account, GNP statistics significantly overstate increases in economic welfare.

It follows that a sector study team should be especially careful to identify and make assessments, as far as is practicable, of all externalities originating within the sector, as well as those originating outside it and having an adverse effect on it.

One useful result from fully taking externalities into account is that any apparent contradiction between "fisheries management" and "fisheries development" disappears as the entire impact on fisheries resources of fishing operations is included as a cost.

This issue is referred to in greater detail in section 6.3.

5.4 Value Added and Economic Benefits

It is a mistake in a sector study to assume there is always net economic benefit from a relatively high value added⁴. For

⁴ Value added is the difference between total revenue of a business and the cost of bought-in materials, services and components. It thus measures the value the business has added to these purchased inputs by its processes of production. One way to calculate GDP (and therefore GNP) is to sum the value added in an economy.

example, the contribution of the fisheries sector to total value added is relatively high in some countries where large numbers of people are employed in the sector. It may not be the case, however, that the net economic benefits generated by the sector are necessarily high. On the contrary, they could be low, or even negative, if the sector has attracted an excessive amount of capital and labour. Where this situation occurs, there would be net economic gains if capital and labour were withdrawn from the sector. In time, these gains would feed back into improved growth statistics.

A sector study team should be aware that high levels of employment and earnings in the fisheries sector are not necessarily beneficial to an economy and be prepared to make its analysis accordingly.

5.5 Considerations Other Than Economic Welfare in the Selection of Information

It was stated above that the contribution of the sector to economic welfare should be the underlying principle in a sector study. It should not, however, define the entire scope of a study. Many governments regard the fisheries sector as providing other services to society, apart from making a contribution to economic growth.

The concern which many governments place on the creation of rural employment has been referred to above. The role of the sector in providing food may be an important concern to some governments (although, with regard to this issue, see sections 6.17 and 6.18) and some may see the sector as having a strategic role, especially if the industry is located in border or remote areas. A range of social factors may play an important role in policy formulation and, therefore, have to be considered in the sector study. For example, the fisheries sector may provide employment for a particular religious or cultural

group, or it may be an important source of female income and employment.

As stated in the outset to this section (5.1 above), one of the first jobs of a sector study team is to establish the sponsor's concerns so they may be appropriately reflected in the study.

5.6 Summary—Criteria for the Selection of Information and Analysis

Information should be selected having regard to issues concerned with the contribution of the sector to national economic wellbeing.

An important measure of the economic significance of the sector is its contribution to GNP or GDP. The externalities present, however, may mean that this measure overstates the sector's contribution to economic welfare. A sector study, therefore, should take care that externalities are taken fully into account.

The team should be aware that high value added in a sector is not beneficial to an economy if an excessive amount of capital and labour are employed in the sector.

The team should be aware of the government's concerns which are not directly related to the net economic benefits generated by the sector and incorporate them into the study.

6. SOME ISSUES IN FISHERIES SECTOR STUDIES

In the previous section it was noted that the process of examining the sector from an economic perspective draws attention to many of the issues which need to be considered. In

addition, the sponsors and the government may have their own views about issues of special concern.

This section introduces a number of the main issues that are likely to arise in studies of fisheries sectors. It is not exclusive and there may be others which will be apparent to a sector study team when it examines a sector.

Many of the points noted will be relevant to various aspects of the study. It is not possible, therefore, to state in advance where issues should be placed in the final report, although some suggestion as to where they might be relevant are noted in the suggested chapter headings of a sector study contained in section 10 of this Guide.

6.1 Fish Resources as Strategic Assets

A commercial fish resource is an asset because it is capable of generating a flow of benefits; a recreational fish resource also can often be treated as an asset. One of the chief ways in which the value of fisheries to a country can be enhanced is through effective control and management of those resources. Fisheries development strategy, therefore, should be directed, *inter alia*, towards this end.

A sector study team should examine what is, or should be, the focus of fisheries policy in the country. The first requirement is a description of the resources and an examination of those species which, in terms of their economic importance to the country, represent priorities for research and management.

Very often, a fundamental potential source of improvement in resource use is the better management of that resource. This general conclusion can be reached without detailed information about a fishery and does not require a

complex research programme to verify. The observation of declining total yields, low catch rates and marginal fishing vessels just covering the opportunity costs of operating in the fishery constitute enough information in practice to confirm that there are weaknesses in the management of the fishery.

However, whilst this observation has a general application, governments are able to act unilaterally and effectively only when the fish stocks lie wholly or mostly within their area of national responsibility. When stocks are shared with other States, or are straddling, effective national action can only be taken in conjunction with other States which have an economic interest in the fish stocks concerned.

A sector study should include an assessment of the extent to which control and management are currently being achieved and proposals for future action, for example, the preparation of a fisheries management plan concurrently with the preparation of a sector development plan.

A final word of warning may be needed. The use of the term "the maximum sustainable yield" of a fisheries resource, is highly misleading if it is intended to denote the optimal level of exploitation and to be a target level of annual catch. Even if the knowledge of resources permits an estimation of MSY, this point will not coincide with the level of yield which would ensure the biological sustainability of the resource; in most cases, it is this latter point which will be consistent with the maximization of economic efficiency.

6.2 Sustainable Development

In line with this last point, the objective of sustainable development is a guiding principle of fisheries management.

In most economic models of fisheries the maintenance of a stable and sustainable flow of benefits from the fish resources is a condition of optimality built into the logic of the analysis. Moreover, if, over time, the value of the fishery as a source of economic benefits can be expected to increase, this factor will tend to shift optimal catching strategies towards the future, when the benefit/cost ratio is greater, rather than to the present. To the extent that there are theoretical exceptions to this (Clark 1990), perhaps these can be regarded more as exercises in analysis rather than policy recommendations.

When considering sustainability, it may also be relevant to distinguish between different types of fishing fleets. For example, the evidence collected for the study may suggest that some of the underlying conditions of artisanal fisheries are conducive to sustainable development. The conditions that might be relevant include a strong orientation among the fisherfolk to collective action, taking a long-term view of needs and an aversion to risk. In contrast, industrial fleet operations may be more competitive and risk prone, and also require a rapid return on investment. In these circumstances, it could be argued that the institutional and social context of artisanal fisheries supply a foundation for sustainability not present in more competitive industrial fishing. Equally, it must be said, the evidence could point in the other direction. A small number of businesses engaged in well organised industrial fisheries may also carry the potential for sustainable fishing operations, implying a corresponding stability of income and employment⁵.

⁵ This paragraph only touches the surface of some insights from public economics, including game theory. Under certain conditions repeated plays of "prisoner's dilemma"-type games can produce cooperative outcomes. A very approachable introduction to many of the issues, including the application of game theory to the management of the commons, is in Ostrom (1990).

Where there is increasing population pressure on an artisanal sub-sector, its capacity to develop approaches to fisheries management is weakened (Pauly, 1990). In this situation, it is often relevant to examine the alternative employment opportunities for artisanal fisherfolk which might go some way to ensuring that the industry does not have to absorb more and more surplus labour.

More often than not, the situation where artisanal fisheries have to absorb an increasing number of people is when these fisheries become the employment of last resort. In this case, unemployment is a structural problem in the economy. There may be little a sector study team can do directly to remedy this problem. It can, however, begin to generate the information which will enable the fisheries administration to show the substantial economic benefits which would arise from focusing the creation of new employment opportunities on relieving the pressure of surplus labour on the fisheries sector.

Most management measures are designed to protect fish stocks rather than to directly limit the access of fishermen to the stocks. Experience shows that such measures have often been successful in the short term in achieving the conservation of resources and higher stock sizes. Their short-term success, however, has meant that their long-term impact has been usually to increase the attraction of the stocks to fishermen, thereby increasing the number of resource users and the intensity of use of the resources and, ultimately, to reduce stock size and resilience.

Other options which may be available are measures to limit access to stocks and measures which restrict access to certain areas by particular users.

However, in general, policy measures which have as their aim the conservation of fish stocks are not the most effective in

achieving sustainability. A sector study team, therefore, should be sensitive to the potential for management based on limited access to fish stocks.

A sector study should be able to point the appropriate direction to take on this issue. It should also generate much of the information required in a management strategy to assist the government in determining the feasibility of some of policy instruments which might be employed, including an assessment of their respective advantages and disadvantages.

6.3 Externalities

Externalities occur when the economic activities of one agent affect another in ways other than through the price mechanism. A comprehensive survey of the economic theory of externalities is in Cornes and Sandler (1986).

The concept of "externality" is fundamental to fisheries. A way of analysing the economics of a fishery is in terms of fishing vessels imposing external costs upon each other. As each vessel enters a fishery it has an impact on other vessels, partly because it catches fish which could have been caught by others, partly because it may impede the operations of others, and partly because of its effect on the capacity of the resource to reproduce.

The fisheries sector may also impose external costs on other sectors. For example, a fishing harbour may create pollution; the cutting of mangrove for fish ponds may reduce the filter properties of a belt of mangrove, so increasing pollution load in the sea, remove a barrier to storm surges, and destroy a fish habitat.

Other sectors may impose external costs on the fisheries sector. There are many such externalities, which may be categorized into two groups. One is pollution and resource

degradation which damages or destroys fish habitat; the other is pollution which has toxic effects on fish.

A sector study team should establish the extent to which the fisheries authorities are aware of the externalities, both generated by the sector and imposed on the fisheries sector from elsewhere, and the extent to which it is and should be taking a proactive role in reducing or mitigating them.

It should be noted that externalities—or unpriced effects—are not exclusive to the environment and natural resources and can be beneficial. For example, the existence of ports which fishing vessels can use, transport infrastructure which widens the market for fish and fish products, and the proximity of a large urban population which offers a nearby market for fish, are examples of positive externalities and provide a synergy between different sectors.

Box 3 examines further this issue.

6.4 Linkages⁶

A sector study identifies linkages between the various components of the sector and between the fisheries and other sectors.

In economic analysis the concept of "linkage" has a precise meaning. Linkages arise when one economic activity influences others through the price system. For example, there is a linkage between fishermen and suppliers of inputs. There

⁶ Conceptualising the fisheries sector using systems methodology is a possible approach to the identification of linkages (Checkland, 1981, Checkland and Scholes, 1990 and Flood and Jackson, 1991).

Box 3: Examples of externalities and integrated coastal area management

There is a *prima facie* case for arguing that resources will flow towards their best use if they are competitively priced; thus in the case of linkages the outcome of a sector study may be simply to ensure that the price mechanism works effectively in the allocation of resources. However, markets rarely function perfectly, and the externality is the extreme case of market failure. For this reason, in most coastal areas, some degree of careful management by the public sector plays an essential part. Two examples follow.

Example 1: Port congestion

A common conflict of use concerns harbour facilities—a resource which is frequently in scarce supply. Commercial harbour users will frequently see the fishing industry as a nuisance—the relatively small fishing vessels impose adverse congestion externalities on the larger commercial vessels. However, it is also quite likely to be the case that the fishing industry generates significant income and employment, both directly and indirectly because of its evident widespread linkages to industries onshore. The onshore benefits from the fishing industry are harder to identify but no less real than those of commercial port operations.

The sector study should appraise the wider contribution of the fishing industry and suggests options for development in this case, port development—which will fully reflect the fisheries sector's contribution to the economy.

cont.

Box 3: Continued

Example 2: Pollution

Pollution management provides a second example to show that in the presence of externalities, free market solutions do not always produce a satisfactory outcome. Consider the case of a river which carries pollution discharged from factories along the river bank. The river eventually reaches the sea where there is an established fishery. If the pollution causes lower catch rates than would otherwise be the case, it is in the interests of the fishermen exploiting the fishery to pay for its control. But they would most likely refuse to pay, not only because they would see themselves as the victims and the factories as the perpetrators, but also because they would fear that some fishermen, perhaps from some other area, would take advantage of their efforts. Would the factories pay? For them discharging pollution into the river costs nothing. Even if public spiritedness induced one or two to incur the perhaps heavy cost of controlling or stopping the production of harmful effluent, they would complain that others were free riding on the back of their efforts. In these and similar situations, intervention by the authorities is generally required, for which a range of policy instruments may be considered.

Example 3: Other examples, in brief

Numerous other conflicts between resource users can arise. For example, the catching sector may be in competition for the seabed with gravel dredging operations. The coastal aquaculture industry may be in conflict with conservationists and with small-scale fishermen. Rural agriculture and tourism may compete for resources and space with the fisheries sector.

are many other important linkages too, such as in the fish distribution chain (wholesalers, processors, consumers); often, in inland aquaculture, between aquaculture and agriculture; and, sometimes, between the fish processing industry and the food processing industry.

Linkages become especially important in economic assessment when there is underemployment or unemployment. This is because a change at the beginning of the chain of linkages will cause multiple changes further down the chain.

If there are significant linkages in the fisheries sector, the impact, in terms of the consequences on employment, of a fall in fish landings can be multiplied several fold through ancillary activities to the catching sector and in the processing and distribution system. When there is also significant unemployment or underemployment in the economy generally, other sectors will not be able, at least in the short to medium term, to absorb the redundant labour.

Where there are such significant linkages—and a major fish processing and distribution subsector is not required to create them—the fallacy is apparent of a strategy which is aimed at keeping vessels at sea to maximise employment in a fully or overexploited fishery. Whilst such a policy may maximise employment on vessels in the short term, it will have the effect in the longer term of reduced landings and, therefore, reduced employment on shore. In addition, the increased risk to the long-term sustainability of the resource will be a further threat to employment.

In many countries there is also a linkage between agriculture and small-scale fisheries through the labour market. Labour shed from agriculture (and also other industries) as a result of, perhaps, changes in the agricultural outputs produced, often takes up fishing as an alternative source of income. Many

artisanal fishermen are also part-time farmers. These relationships need to be identified so that the full implications of policy proposals are understood.

A sector study team should view such changes in terms of their contribution to economic welfare.

6.5 Technical Aspects

Underlying the analysis of values are all the technical relationships of the industry—the relationships between physical inputs and output. This relationship is known as the production function. A sector study should examine the scope for combining inputs in a better way than they are combined at present, to save on resources or to increase output; in other words, to make production more efficient.

Some examples are shown in Box 4.

6.6 Conflicts Between Interest Groups

Conflicts arise between groups of fishermen because of competition for fish resources. A sector study should report these and suggest action to alleviate problems. Very often, in exploited fisheries, fish which is not caught by one fisherman will be caught by another. Access, therefore, can easily become a source of dispute. Conflicts are particularly acute in fisheries compared to other industries because fishing grounds are often open, to a greater or lesser degree, to competitors. In this respect, the industry is unlike most others.

Economic benefit results from a reduction in conflict. The costs incurred in the "rush for fish" are reduced as fishing skippers take a more calculated approach to their best opportunities. These may arise through a more measured exploitation of fish marketing opportunities or greater economy

Box 4: Examples of the investigation of production functions in fisheries sector studies

Example 1: Relationship between fishing effort and fish yield

A sector study brings together what is known about the biology of the resources exploited by the country's industry. It should aim to specify a relationship between fishing effort and catches so that estimates can be made of outcomes under different assumptions. In particular, it should aim to reach a judgement about whether the relationship between fishing effort and yield can be made more efficient, that is a reduction in fishing effort to catch the same or larger quantity and value of fish.

Example 2: The ability of the fishing fleet to optimise its contribution to economic welfare

A sector study reviews the state of the fishing fleet. It does this to reach a judgement about whether it is of an appropriate size and composition for the available resources, and whether the technology used on board is appropriate for the country and the resources available to it. It examines the age and condition of vessels to assess the scope for replacement.

Example 3: The capacity of the aquaculture subsector to optimise its contribution to economic welfare

Where appropriate, a sector study reviews the current state of aquaculture. It examines the country's fish farms to see if inputs are being used efficiently to produce fish. It comments on the technical capability of the farmers and might make recommendations for the upgrading of people and systems. A study might propose ways in which production from aquaculture might be expanded. In other words, a sector study examines the availability of inputs, e.g., land, water, labour, and equipment, etc., to compare what is being achieved with what could be achieved.

in fishing practices. Furthermore, the social problems which arise when people's lives are disrupted by fishing disagreements are reduced.

When a study team seeks to make a qualitative assessment of the potential gain from the reduction in conflict on a fishing ground, it is important to be clear about the distinction between productivity and efficiency. Productivity is a measure of output per unit of input (usually labour or capital). More efficient fishing systems are those which generate larger net benefits by increasing the value of output or reducing the unit cost.

This point is noted in this context because it may be mistaken to resolve conflicts on the fishing grounds on the assumption that because larger vessels are more productive, as measured by output per man, or by some unit of production, they necessarily provide greater economic benefits than smaller vessels. On the contrary, it is quite possible that smaller vessels are more efficient because the cost per unit of fish landed is lower or the value of their catch is higher.

Establishing the relative efficiency of different groups of vessels in this type of situation may be one of the cases where the sector study team should investigate primary data.

6.7 · Fisheries Authorities

The sector study should consider the effectiveness and efficiency of the fisheries authorities. The term "fisheries authorities" refers to the organizations responsible for the regulation and development of the fisheries sector at national and sub-national levels, and for the management of fish resources. In many situations but not all, these responsibilities will rest with fisheries departments. The paragraphs below are written within this context. However, a sector study team

should be aware that fisheries administration and fisheries management may be implemented through more than one organization.

Effectiveness refers to the capacity of the fisheries department to meet the objectives of the sector. An effective department must be able to carry many functions which include the following:

- identify the statistics required and to either collect them directly or be able, where appropriate, to work through other government agencies in their collection;
- analyse data for the formulation of strategies, plans and projects;
- develop coherent proposals for limited access and/or effort limitation in capture fisheries and have the capability of implementing subsequent decisions;
- formulate and implement plans, programmes and projects, and monitor and evaluate them by having the appropriate tools and techniques at its disposal.

Within this general capacity, the fisheries department would be able to defend the interest of the fishing industry in negotiations with other ministries or departments when dealing with cross-sectoral issues and in the negotiation of budgetary allocations.

Efficiency refers to the capacity of the department to operate at a reasonable level of cost. It is not possible to supply an objective measure of whether a department (or any bureaucracy) is worthwhile. However, the economic rule which states that a service should be expanded as long as marginal benefit resulting from it exceeds its marginal costs is a helpful

guide. For example, the potential incremental gains from the effective policing of EEZs which accrue to producers and consumers, are often large. It may be worth incurring, therefore, significant costs to achieve effective policing.

Similarly, the potential net incremental gains from an effective extension service to aquaculture can be large. They may accrue to producers in the form of extra profits, but may also benefit consumers if production increases and prices fall.

The expected incremental gains provide a rough guide to an upper band as to how much should be spent on a particular service provided by the department. There are, however, many instances of services provided by government which are more costly than any conceivable benefit resulting from them.

A sector study, therefore, should report on the current state of the department, reaching a judgement about skills and expertise, number of staff and its capability to work for the development of the industry. A sector study should also recommend any changes which the sector study team judges to be required. It might be proposed, for example, to end some activities currently carried out by the public sector, or to introduce some new specialist skills, or to introduce an internal training programme.

6.8 Other Institutions

Other institutions will almost certainly be involved in the fisheries sector. Some of these will be part of the public sector whilst others will be private sector institutions.

In the public sector, the trade department might be responsible for marine safety, the armed forces for fisheries protection, the foreign affairs department for international negotiations, various regional authorities for other aspects of

administration. There may be an institution charged with the coordination of projects and activities in the coastal area. Other organizations may have official responsibilities to the industry on issues such as food safety, customs regulations, ports and harbours, training and research. Different organizations will have responsibility for the collection of different statistics of value to the fisheries department.

The organizations described above may have a direct influence on the sector. Others may have an indirect, but important, role. Examples are organizations responsible for river and lake basin management, and for water management.

A sector study team should also take into account private sector organizations, such as cooperatives, trade associations and non-governmental organizations (NGOs) at the national, sub-national and local level.

A sector study should identify all relevant institutions at a national, sub-national and local level and describe their role, the extent to which their functions overlap and where there are any gaps. It should also reach a view on their relevance to the successful management and development of the sector at present and under any of the proposed options for development.

6.9 Legislative Framework

For a number of reasons a necessary condition for a successful fishing industry is a respected and durable legislative framework (North, 1990). In particular, fisheries management, and hence the economic gains associated with it, cannot succeed without a system of regulation which is respected by the fishing community.

The framework of laws and regulations can influence the industry in other ways. For example, foreign exchange control may limit the access of the industry to important inputs; hygiene

regulations may penalise small-scale, low capital producers; or minimum wage legislation may limit the scope for employment in fish processing.

A sector study should examine the legislative framework within which the industry operates and assess the extent to which it adds or detracts from its successful economic performance. It should be noted, for example, that conventional fisheries regulations and legislation—which are aimed towards fish conservation—may have the long-term effect of reducing economic welfare; other solutions to over-exploitation of stocks may have to be sought which incorporate ways of limiting access to them (see 6.2 above).

6.10 Monitoring and Enforcement of Management Regulations

All fisheries require management. Perhaps the key issue in the success or failure of any management plan concerns the monitoring and enforcement of regulations. So far as possible, regulations and legislation should be designed in collaboration with the sector and efforts made to convince the industry of their value. In this way, voluntary compliance with regulations will be increased. Fishermen's reactions to regulations will also be influenced by the perception of the fairness, or equity, of the system held in place by the regulations. A system which is widely recognized as being fair, will be more likely to be one where peer pressure assists in creating a general observance of regulations. In its review of legislation and regulations, a sector study team may find it necessary to examine this aspect.

However, whatever the degree of participation by the industry in the framing of legislation and regulations, governments require a strong enforcement capability. This is so whether the regulations and legislation are designed to limit access to the resource or, more conventionally, to protect the stocks. The sector study will examine the enforcement

capability, its effectiveness and the institutional framework within which it operates.

6.11 Research

It is important that fisheries management regulations are reinforced by an appropriate research programme which will indicate the benefits to be derived from different measures.

A sector study should evaluate the performance of official research for the sector. The fundamental question concerning officially sponsored research is whether it contributes to development objectives. Quite frequently, the sector as a whole rather than individual businesses is the beneficiary of such research which would not normally attract private funding. It is important, however, that a research establishment should have clear research objectives with proper procedures for the evaluation of its work.

A sector study should also examine the scope and value to the industry of non-official research, for example, in universities.

A sector study team should examine how research objectives are set. Whilst a certain amount of individually determined research may be encouraged, the main body of research work should be clearly related to critical issues confronting the fisheries authorities. The team should look, therefore, for a transparent institutional link between the fisheries authorities and the research functions.

In examining the response of the fisheries research function to critical issues, a study team should take into account the cost and length of time required to acquire sound quantitative results. In these circumstances, a team should look to see what approach has been adopted by the research establishment, and with what success.

Researchers may, either by conscious decision or by default, adopt a long-term approach to research. However, the time may not be available for a long-term approach but it may be possible to achieve robust qualitative results in a shorter term. A sector study team should consider if some long-term programmes might be replaced by shorter-term approach. Such an approach might possibly be adopted in conjunction with the Precautionary Principle, under which actions which are suspected to have severe environmental implications are banned unless the originators can prove they are benign.

Box 5 lists some of the critical issues which may form the subject of research.

Box 5: Some possible critical areas for fisheries research

Assessment of whether there are any endangered or threatened species.

Determinants of key parameters, e.g., growth, reproduction, productivity, biomass.

Assessment of the effects of fishing and coastal aquaculture on the ecosystem and on fisheries sustainability.

Identification and assessment of the impact on fisheries and aquaculture of pollution and habitat degradation (requiring information on the status of fish habitats, such as mangrove, seagrass beds, and coral reefs, extent to which they have been degraded, identification of activities responsible for their degradation and future threats and, if possible, monetary valuation of the damage).

Another avenue to examine is to what extent, and through what institutional mechanisms, the research organization is aware of and responsive to the perceived needs of the industry resulting from factors originating outside the sector.

A sector study should examine the dissemination of officially funded research. Staff of research institutes should be expected to publish in scientific journals but it is important also to produce information leaflets for the sector and the general public.

If countries are going to make progress in fisheries it is essential that officials, researchers and others have access to good information. The fisheries community needs to be able to participate in worldwide research so that the results can be applied in all countries. For example, if researchers in one country develop a new approach to the analysis of the dynamics of the deep water snappers, then that information could be important in the management of resources in a number of others. A sector study, therefore, should look at channels of information to ensure that national research teams are not "reinventing the wheel" and are benefiting from all relevant work.

A sector study team should take care to avoid focusing too narrowly on what may be perceived to be fisheries issues. Research of value to the fisheries sector will be concerned also with cross-sectoral issues, as well as the traditional sectoral research concerns. Such research, e.g., in gaining a greater understanding of ecological functions and aspects of resource dynamics, may be closely related to sectoral research; other research may be outside the usual competence of fisheries research institutes, e.g., in socio-economics and institutional economics.

Fisheries authorities do not have to ensure that all research is carried out by their scientists. A sector study, however, should reach a judgement on (i) the level of communication between the industry, on the one hand, and the policy makers and scientists, on the other; (ii) communication between policy makers and scientists, to ensure that the correct priorities are set and to establish that the priorities match the funding; and (iii) that the fisheries scientists are aware of relevant research being carried out elsewhere.

6.12 Social Issues

Equity considerations are taken into account in policy and project choices through socio-economic analysis. By undertaking some socio-economic analysis in the sector study, a sector study team introduces a check to policies and projects aimed solely at profit maximisation.

Box 6 provides some examples of how this might come about. A sector study asks if the evolution of the industry is causing discrimination against any particular social group, such as a cultural group or a gender. It also attempts to predict possible damage to sub-populations under different policy options.

Socio-economic analysis examines the social implications of fisheries policies. Among other issues, a sector study might consider alternative employment opportunities for fisherfolk either within or outside the sector as fisheries management might imply a reduction in fishing effort, which will lead to fewer job opportunities for fisherfolk; even if there is no immediate requirement for a reduction in the number of vessels, changing technology and resource limits may limit the employment opportunities on board individual vessels.

Box 6: Examples of damage to fishing communities

Small-scale fishermen may be victims of industrial fishing methods.

Coastal aquaculture development may sometimes be damaging to artisanal fisherfolk or small farmers.

The creation of new outlets for fish may remove fish from the traditional distribution system.

Fisherfolk may be physically displaced from their homes by development activities, e.g., tourism.

Using socio-economic analysis, the study should seek to take as wide a view as possible of the factors contributing to fishing pressure on fish stocks and how far a fisheries development strategy can address the problem. In some instances, such a strategy might seek interventions from other government agencies. For example, as part of a long-term strategy, a fisheries department might seek improved communication links between fishing communities and nearby rural centres, improved health care facilities, education of children and, recognizing the link between the education of women and smaller family sizes, special attention being given to the provision of secondary education of girls. A general guide to taking social issues into account in development projects is published by the Asian Development Bank (1991). Gender issues are covered in Ostergaard (1992) who emphasises the importance of gender awareness in sector and project analysis.

A clear definition and understanding of the artisanal subsector in the fishing industry becomes especially important in the context of socio-economic analysis. The subsector often

consists of fishermen and women who are not well organized, many of whom operate part-time, and many of whom are on the margins of the industry earning low incomes and with little access to credit and infrastructure. The subsector may employ large numbers of men and women, the latter largely in fish processing and distribution.

Some examples of information which would contribute to a socio-economic overview are listed in Box 7. In each case, the information may relate to the current situation but a historical comparison might be useful in showing whether and how conditions are changing.

6.13 The Human Resource—Distinctive Capabilities

The role of human resources in the process of development is fundamental. An obvious point, but worth making, is that it is human skill and ingenuity on the one hand, and human wants on the other, that make a fish industry possible. The people who possess the expertise to exploit the resource, to organize production and distribution and to anticipate changing markets are what makes the industry work.

Kay (1993) uses the phrase "distinctive capabilities" to denote the characteristics of human resources which give individual businesses or countries a competitive advantage. For example, in the fishing industry particular strengths might include experience and skill in managing fishing vessels at long distance or organising fish buying for processing on the high seas ("klondyking"). Some countries have capabilities in the construction, repair and maintenance of fishing vessels and others have a long tradition of aquaculture production. Fishing skills are often identifiable with a particular group of people and equally some groups have established reputations as entrepreneurs and traders.

Box 7: Examples of socio-economic information

Identification of industry participants, by age, sex, full-time, part-time, dependents and location.

Payment methods for work.

Incomes and prices of inputs and outputs.

Conflicts.

Complementary and/or alternative employment opportunities.

Ease of entry to the sector.

Ease of exit from the sector.

Health, especially of children.

Life expectancy.

Access to health services.

Literacy.

Primary education enrolment, in numbers, by gender and as a percentage of totals by gender in age group.

Secondary education enrolment, in numbers and as a percentage of totals by gender and by age group.

Other indicators of educational status.

Maternal and infant mortalities.

Nutrition statistics.

Access to potable water.

Access to adequate sanitation.

Housing.

Participation of women in the sector.

A key question for a sector study is, therefore, what are the special characteristics of a people which can add value to the processes of production and distribution of fish? This question must be addressed both within the review of the current situation (the "stocktaking"), and also—to determine the human resource potential—in the analysis section of the study.

While it is evident that cultural heritage, skills and aptitudes should be harnessed wherever possible, experience shows that people may find great difficulty in adopting new skills and adapting to a different way of life associated with them. Schemes to transform meat eaters into fish eaters and fishermen into farmers, or even fish farmers, have often been unsuccessful.

One of the roles of a sector study is to identify where existing skills and aptitudes can be built upon to catch and market underutilised species, to improve the quality of production, and other ways to generate increased economic benefits. The requirement for training target groups, and how such training might be delivered may be a topic dealt with in a sector study.

The issue of gender has been referred to above (section 6.12). Nevertheless, the issue is sufficiently important to note again, here, that a sector study should describe and analyse the role of women in all aspects of the fishing operation. In many countries, the role of women in the processing and distribution sector is central.

6.14 Industry Structure

The structure of the industry may be a matter for the concern of government. For example, a government may seek advice on ensuring that vessel ownership remains widely dispersed, and not excessively concentrated in the hands of a

few companies or individuals. It may wish to review the relative merits of cooperative or private ownership of industry assets.

The ownership pattern in the industry may also be significant for social analysis. For example, the requirement to rent boats from non-fishing owners of vessels may be a factor responsible for low fishing incomes. Moreover, the consequences of losing the right to fish, perhaps because of payment default following from overfishing and insufficient income, may be very serious for the families concerned. The sector study should also show gender awareness when examining ownership patterns.

6.15 Innovation

Innovation may be related to a number of the areas considered in this section. It is important because it is a means of creating and sustaining comparative advantage. A sector study, therefore, should examine both the record of the introduction of new technology into the sector and what conditions have to be met to ensure the sector is competitive in the future. Box 8 lists some of the areas which a sector study team might consider in the context of innovation.

6.16 Privatisation

An issue which is likely to be important in many countries concerns the reduction in the role of the State in enterprise ownership and management. The case for reducing or ending the State ownership and control of many potentially commercial assets is now widely accepted. It is based on the view that, in general, commercial activities are carried out more efficiently by private rather than State enterprises.

Box 8: Possible areas for innovation in the fisheries sector

Vessel design.

Gear design.

Fish finding equipment.

On-board fish handling and preservation.

On-shore handling, processing and marketing.

Fish farming systems and technology.

The route that countries are taking from State ownership to private ownership is varied because there are many different approaches. To take a simple example, three options (amongst others) for the privatisation of a State fish marketing organization might be (i) closing down and sale of the equipment; (ii) sale of the enterprise as a going concern to the private sector; and (iii) the formation of a cooperative of some of the workforce to buy the company.

The issue is complex and, therefore, must be handled with care in the sector study. A summary of the principal techniques of privatisation can be found in Vuylsteke (1988).

When considering privatisation issues it is also worth recalling that the public sector has a positive role in fisheries administration and development but that the dividing line between what are appropriate activities in the public and private spheres may need careful consideration.

Fisheries are a natural resource which is very often an open access property to a greater or lesser degree. The open access nature of the resource means that without some form of intervention by the State, market failure and resource

misallocation can be guaranteed. The case, therefore, for an involvement of the State is stronger than in many other industries. Sometimes, it is difficult for governments to determine where that dividing line should lie. Some governments, for example, have sought to regulate fishing through a State controlled fish marketing organization. The sector study team should be prepared to analyse this issue and provide the appropriate option(s) to the government.

6.17 Food Security

Food security means that every household in an economy should be able to produce or purchase sufficient food to meet daily requirements (Baum and Tolbert, 1985). To achieve this end, governments need to address both the supply and demand for food.

Recent economic contributions (summarised in Ellis, 1992) have shifted the focus of analysis of food security to adequate distribution and effective demand for food. One reason for this shift is the fact that at a global level, food availability has tended to outstrip population growth since the mid-1970s. Many regions of the world have moved into food self-sufficiency from a food deficit, and Western Europe and North America have shown a persistent tendency to produce structural surpluses of food.

The orthodoxy which concentrated on food supplies has now been re-examined and found wanting. The essence of the new approach is that, in general, people do not starve due to an insufficient supply of food; they starve because they have insufficient command over food. Thus, an overall deficiency in food production is only one of many factors which may cause food shortages. Sudden price rises, sudden falls in income, or low family income, or a particular distribution of food within a family can also be among the responsible causes.

For fisheries policy, the implication of this argument is that the case for the expansion of fish production as a contribution to food security needs to be examined with great care. In many countries, the greatest contribution that fisheries development can make to food security is by increasing incomes through greater economic efficiency and, therefore, command over food supplies.

A sector study may not be able to reach a firm conclusion on this issue although it is likely to have implications for the allocation of public sector resources. This might be the case if the government has some underlying concern about food availability and a preliminary view about the significance of fish for some groups of consumers. A sector study may, therefore, suggest that the contribution of fish to food supplies should be a subject of further study, possibly within the framework of the fisheries development plan.

6.18 Nutrition

The objective of a policy based on achieving sound nutrition is to reduce malnourishment, especially when this impairs health, growth or productive activity. Such an objective is related to the objective of food security, although it is not identical. Nutrition has traditionally been a branch of applied biochemistry but in recent years has been studied by social scientists. Some nutritionists now believe that, generally, if people eat enough food (mainly staple grains) and obtain sufficient calories, their protein and vitamin requirements will normally be met (Timmer et al., 1983; Grigg, 1985; Timmer, 1987; Ellis, 1992). Mollett (1990) includes an example from Peru which draws the same conclusion.

Globally, fish makes a significant contribution to dietary protein. The Fifth World Food Survey indicated that the contribution of fish to animal protein supplies in the developing

market economics was estimated to be 20 percent, compared with 15 percent in the world as a whole. These general figures hide wide differences between individual countries, regions and social classes.

In sector study work, therefore, the issue of fish for good nutrition should be handled with some caution. The importance of fish for nutrition in particular situations cannot be assumed. If a government says that it is interested in fish production as a supplement to its objective of achieving improved standards of nutrition, the question arises as to whether the nutritional significance of fish can be substantiated.

6.19 Foreign Exchange

The contribution of the fisheries sector to foreign exchange earnings is often used as an argument for support to be given to the sector.

While the foreign exchange earnings of a fisheries sector may be considered important by the government of a country which is short of hard currency, the issue needs to be handled with caution. It is a fallacy to infer net economic benefits from large foreign exchange earnings. Firstly, the industry uses imported inputs, which should be offset against exports. Secondly, even if there is a net surplus of hard currency earnings, the contribution of the sector to the economy depends on the overall balance between the value of resources in and resources out, not on the traded portion of that balance only.

In this situation, the sector study team needs to have a knowledge of the net economic benefits generated by the sector coupled with the opportunity costs of labour and, especially, of capital, before it can draw conclusions about the economic benefits of the sector's foreign exchange earnings to the economy.

6.20 Marketing

Benefits from improved marketing of fish may include one or more of the following:

- countries can appropriate added value from fish as a result of expert marketing;
- consumers may be the beneficiaries of improvements in marketing; for example, they might get fresher fish at lower prices;
- producers may be beneficiaries if their profits increase as a result of higher prices—obtained from improvements in quality, or lower costs following from improvements in productivity.

The key point is that there are a number of points in the production and distribution chain where increased value can be obtained. Marketing expertise is required to identify the current weaknesses and potential improvements.

Fish marketing is complicated because of the variety of issues which must be considered in a marketing study. A number of these are considered in Box 9.

A sector study should examine both domestic and export markets. Inside the country, public markets are often the channel through which consumers of fish become direct beneficiaries of the activities of the fish industry and also the means by which the sector benefits from consumer demand. However, very often, cleanliness, hygiene, repairs and maintenance of public markets are often conspicuous by the little attention paid to them. Consequently, fish spoilage and lower public acceptance of fish can often result. Public investment to remedy these faults in markets may generate substantial economic and social benefits.

Box 9: The determination of fish prices

Price determinants include the following:

- harvesting technique, e.g., line-caught tuna may be more valuable in the market place than fish caught by means of a purse seine;
- time between capture and use;
- the way fish is processed and held on board influences the final price—cleaning, gutting, ice, the use of containers, temperatures, etc., may all have effect on the value of the fish;
- the way in which fish is handled may influence price, e.g., fish damaged by hooks may attract a lower price than, for example, fish boxed at sea;
- the physical characteristics of wholesale and retail markets, such as air conditioning and cleanliness, may influence prices;
- the grading procedures and the sales procedure itself—price descending or price ascending auctions or contracts—may be significant;
- the distribution system for fish—many issues, such as processing plants, distribution systems, packaging, sales procedures and payment methods are important;
- consumer attitudes—affecting price, income and cross-elasticities of demand—are influential and variable between countries and social groups within countries;
- the prices of substitutes, such as other animal protein foods, are important in price determination.

In export markets, the possible requirement for State intervention is usually different. There are quite likely to be net returns to the country concerned if its exporters can increase profitability through some export marketing. However, it is possible that a thriving fish export industry may have adverse socio-economic effects. For example, a rapidly expanding export trade in shrimp may stimulate aquaculture in coastal regions, which may have harmful social and environmental effects. In such a situation, a sector study has to either assess the likely impacts of such development or, more likely, propose that further investigation is required.

A sector study should review the use made of market information systems; widely distributed information about the various aspects of markets, such as species in demand, prices and presentation, is a means of reducing market imperfections. In this connection, if the team notes that market information is not widely distributed, it should make proposals for improving the dissemination of data.

Marketing is a complex specialist area and a sector study may conclude that further research is required. It might recommend, for example, that a more comprehensive market study be undertaken. This would include an analysis of the structure of the distribution system, the functions of the various agents within it, and an assessment of logistics; costs and margins would also be included.

6.21 Hygiene Standards

An issue which is related to marketing is hygiene standards. The recommended approach to this is the application of "Hazard Analysis Critical Control Point" (HACCP). This should be used as a technique for identifying those processing points where contamination can be best monitored and controlled.

Internationally marketed fish and fish products must meet the standards of the importing countries. The European Union, for example, has defined the health conditions for placing fish and fish products on the market in Council Directive 91/493/EEC. This Directive applies the same stringent conditions to establishments exporting fish to the European Union as it does to domestic fish processors.

A sector study should review food laws designed to ensure the safety of food and protect the consumer, and recommend improvements. Government intervention in this area might include the placing of the requirement upon processing plants to meet specified quality standards, the training and deployment of government quality control inspectors, and the organization of training courses for the fish processing industry.

6.22 Credit

For many developing countries the availability of credit is a problem both in capture fisheries and aquaculture. There are three basic reasons why producers should wish to borrow. They are as follows:

- to finance occasional high expenditures, e.g., a wedding;
- to even out fluctuations in the availability of cash to buy recurrent inputs; and
- to finance investment.

Governments of developing countries and donor agencies have frequently perceived a number of factors as justification for the development of credit institutions for fish producers. These have included the lack of a market in loans, the monopoly

power of private money lenders, and the difficulty of fisherfolk in providing collateral against credit.

In a sector study it is important that the status of credit to fish producers and processors be correctly diagnosed. Further details of how to proceed may be found in Chapter 7 of Ellis (1990).

A number of mistakes have been made in development assistance in the provision of fisheries credit. Taking these into account, a sector study should exercise due caution in its analysis of credit. Facile solutions to the perceived problem can easily worsen rather than improve the economic status of fishing communities.

Some examples of problems associated with credit programmes in the artisanal fisheries sector are shown in Box 10.

6.23 Summary—Some Issues in Sector Studies

The following points of guidance for a sector study team are drawn from the above paragraphs:

- focus on the fish resources of current and/or potential economic importance to the country;
- assess the extent to which effective fisheries management is being currently achieved and examine the fisheries authorities' proposals for the future in the light of their technical and institutional capabilities;
- present the broad management options available to government as a basis for the management and development strategies;

Box 10: Some problems in the provision of fisheries credit

Example 1: Mobilization of rural savings

In many developing countries there are already savings available in the food producing community. Many fishermen and fish farmers (and other food producers) already have savings. The problem may be finding means of mobilising the resources in the community rather than channelling more funds into it. One celebrated example of this process is the work of the Grameen Bank in Bangladesh which has shown that the very poor can save, borrow and repay loans by active participation in the Bank.

Example 2: The prerequisite of fisheries management

In many capture fisheries, the provision of additional credit to small-scale fishermen may encourage the wrong kind of development. Cheaper credit, in the absence of appropriate fisheries management measures, may be a very damaging policy approach. The corollary of this is that effective fisheries management is a precondition for successful credit arrangements.

Example 3: Possible comparative benefits of informal credit

Informal credit may be already available through money lenders. When the risks, transaction costs and expected inflation are taken into account, the rates of interest may not necessarily be significantly higher than rates would be for formal credit when all the costs of credit delivery have been fully taken into account. Moreover, informal credit is often readily available and, from the lender's point of view, relatively secure as it is based on personal knowledge.

cont.

Box 10: Continued

Example 4: Difficulties in the provision of formal credit

For a variety of reasons many formal credit institutions have either had to stop lending or, at least, extremely reluctant to offer credit to the fishing industry. Repayment rates have been poor, interest rates have been too low to cover the costs of money and transaction costs, and the loans offered have been perceived by the recipients as grants rather than loans.

- establish the extent to which fisheries authorities are aware of those externalities generated outside the sector and which impact upon it, and of those which originate within the sector;
- assess the extent to which the fisheries authorities are able to, or should, take a proactive role in the reduction or mitigation of externalities related to the sector;
- identify the economic linkages between components of the fisheries sector and between the sector and other sectors, and assess their contribution to economic welfare;
- examine the potential for combining inputs in a better way in order to save resources or increase output, or both;
- report on conflicts and propose ways in which they may be alleviated;

- assess the effectiveness of the fisheries authorities and make proposals for improving the efficiency with which they meet the objectives of the sector;
- identify where there are gaps and overlaps between the fisheries authorities' work and that of other institutions;
- examine the legislative and institutional framework within which the industry operates and assess the extent to which it adds to, or detracts from, its successful economic performance;
- examine the level of capability of monitoring, control and surveillance together with the degree to which regulations are enforced, having regard to the institutional setting and the effectiveness of the relevant institutions;
- reach a judgement on the effectiveness of fisheries research in terms of its making a satisfactory contribution to the sector achieving its development objectives, and identify any impediments to this by examining the institutional framework, methodologies, information systems and the dissemination of research findings;
- show awareness of, and sensitivity towards, social factors which may have a strong influence on the capacity of the sector to contribute to national well-being;
- identify where and how existing skills and aptitudes can be further developed to generate increased benefits;

- review the structure of the industry in the light of the government's objectives, and make appropriate recommendations;
- examine the record of the introduction of new technology and management techniques to the sector and assess what conditions have to be met to ensure the competitiveness of the industry;
- identify factors relevant to the proposed privatisation of State-owned assets and make appropriate recommendations;
- take into account, when formulating recommendations, any governmental concern there might be regarding the importance of fish to food security and for nutritional purposes;
- assess the contribution of the sector to net economic benefits where its contribution to foreign exchange is used as a justification of a high level of government support;
- examine the marketing of fish, both domestic and export, and make proposals as to how economic benefits may be enhanced;
- consider the effectiveness of credit programmes in the artisanal subsector and make appropriate recommendations.

7. MANAGEMENT OF SECTOR STUDIES

7.1 Sector Study as a Project

The preparation of a sector study is a project involving a concentration of resources over a limited time scale to achieve a stated objective. It is likely to be sponsored by the government of the country concerned, although other institutions may be involved in the decision to undertake an analytical review of the fisheries sector.

For its completion the team leader needs to have in his/her mind a concept of what he/she is trying to achieve. This must be agreed with the sponsor of the project. The team leader has to convey this vision of the final output to the team of consultants employed to do the study.

The consultants might be from the private sector, but might also be from a public sector institution.

The team leader is the project manager. His/her job is to produce a document within the constraints of cost and time. In this context, project success is the production of a document which meets the requirements of the project sponsor.

A key condition to achieving success is a carefully prepared project brief, usually described as terms of reference. This is a document that must be agreed to by all the relevant parties.

The contract between the sponsor and the consultants has a legally binding basis but is also, in very large part, a "relational" contract. Relational contracts are put in the context of sector study contracts in section 7.2.

The successful completion of the project, namely the completed report, depends on goodwill and a mutual understanding of what is required; in short, good relationships. The need to build good relationships is an obligation on all ideas.

7.2 Preparation of the Terms of Reference

Who prepares the terms of reference?

In theory, the terms of reference should be prepared by the sponsor of the sector study, likely to be the government of the country concerned. In practice, however, the sponsor may invite the consultants to prepare draft terms of reference.

The preparation of the terms of reference merits particular attention because they are the basis for agreement between the sponsor and the consultants. However, they can never include everything. It is in the sponsor's interests, therefore, that the consultants should be able to identify and deal with aspects of the industry which have been omitted or only covered partially in the terms of reference. Business contracts in such situations are known as relational contracts because many of the obligations upon the parties are implicit and cannot be written out in full.

Agreement is essential between the sponsor, the consultants, and other interested parties on the terms of reference, as well as on any other issues concerning the conduct of the study. Such agreement ensures that the sponsor, other interested parties and the team leader know precisely the limits of their respective responsibilities. In turn, this mutual agreement enables the team leader to convey to the team members their individual terms of reference.

What should be included in the terms of reference?

There are no hard and fast rules about the contents of the terms of reference because they depend on the circumstances of the sector. The Appendix contains an example of what might be included in the terms of reference for a study of a fisheries sector which includes an artisanal sub-sector, some aquaculture, and an industrial fishery with some industrial fish processing.

Box 11 shows a summary of what is required in terms of reference.

7.3 Selection of the Consultants

The sponsor of the project would normally circulate the terms of reference to companies which might be interested in bidding to undertake the study. The list of companies invited to bid is usually restricted, although open competition is possible. The preparation of a bid might take up to a man/month and could also involve travel to the country concerned, representing a considerable investment of time by the bidding consulting companies (Westring, 1985).

The selection process is usually formal. Sealed bids are compared on the basis of agreed criteria. The evaluation of proposals may be on the basis of four main criteria. These are as follows:

- the firm's general experience in the preparation of sector studies;
- the adequacy of the proposed workplan and the general approach;
- the quality of the personnel proposed;
- cost.

Box 11: Summary of content of the terms of reference for a fisheries sector study

Overall Objectives

The overall objectives of the study should be stated. These give the consultants a clear picture of what the sponsor hopes to get out of the study. They are an elaboration of the overall purpose of the study in the light of the agreed standpoint of the chief interested parties—usually the government and (if different) the funding agency.

Detailed Tasks

This is the main part of the terms of reference. The list of detailed tasks is a guideline for the sector study team leader. It should aim to note all the main issues as perceived by the government. However, as noted in the main text, the contract between the sponsor and the consultants is relational. The work of the study must be built on a good understanding between the team leader and the sponsor; what is written is a guide rather than a set of hard and fast rules.

Working Approach

The terms of reference also state how the preparation of the report is to be managed. While the work is going on, the team will have to report to a senior official or a steering committee in the country. The terms of reference also clarify the relationship between the team and other individuals, departments or institutions. It will be important for the team to have access to information other than that held by the fisheries authorities.

cont.

Box 11: Continued

Special Skills Required

The sponsor will have developed a view of the special skills which it has deemed are required for the successful completion of the study. The expertise required will depend on the perception of the problems in the country concerned.

Working Plan

These Guidelines have expressed a bias for concise sector studies which focus on broad issues rather than the details. Under this approach, the time required from the date the consultants begin work to the presentation of the final report could be from three to six months. The terms of reference will state the allocation of time to the study as well as stating the number of man/weeks or man/months which are allocated to report writing. The precise length of time taken by the study will depend on the sponsor's requirements. The consultants would then be expected to set out a detailed workplan to accompany their bids for the work.

Contractual Conditions

A section of the terms of reference will outline the contractual conditions for the study. It will state the responsibility for costs, including fees, per diem and fares, printing, etc. The number, timing and language(s) of the draft report and the number, timing and language(s) of the final report will be set out. In some cases, the sequence of reporting is more complicated, with inception, mid-term, draft final, and final reports being required.

7.4 Selection of the Team

A sector study is primarily an economic appraisal of the fisheries sector and its preparation depends on economic expertise. This does not necessarily mean that the team leader should be a trained economist—project management skills might be more important. However, it should be recognised by all concerned that economics expertise should take precedence, in guiding the selection of information and ideas, and in the writing of the final report.

No attempt is made here to define in detail precisely what other skills are required. This will depend upon the circumstances. For example, a sector study team for a developing country attempting to foster inland aquaculture as part of a policy of intensification of agriculture production, will probably require the inclusion of a team member with experience in farm systems and aquaculture; a sector study in a developing country with large numbers of artisanal fishermen operating along an extended coastline would require a significant input from a socio-economics expert with experience of working in artisanal fishery subsectors; in most capture fisheries projects, a fisheries management expert will be required; in almost all projects, an institutions expert is likely to be included.

The approach recommended here is that the sponsor should identify the specialisms required rather than particular persons. It may be that a team member is able to contribute in more than one area, such as economics and marketing.

Team members will be internationally recruited experts but nationals of the country concerned should also be considered. There may be considerable benefits from including in the team as many national experts as possible. At the least, international experience and analytical skills contributed by the internationally recruited experts will be complemented by the

detailed knowledge of the local industry provided by the national experts. Increasingly, however, good analytical skills are to be found in developing countries and this factor might be taken into account when a sector study team is being recruited.

7.5 Management of the Team

The preparation of a sector study is a project and the team leader is the project manager. As for any other project manager, a sector study team leader has to achieve a certain objective within a defined time period and within a budget. The team leader also has to contend with uncertainty of operating in a new environment, working with a group of people whom he/she may not know, and seeking to be an inspiring as well as a competent administrator. It is an extremely challenging and difficult task to do well.

What makes a good leader of a sector study? Turner (1993) and Geddes *et al.* (1990) include further discussion of this question.

The team leader must understand the overall picture. As noted above, this fact does not necessarily mean that the team leader should be an economist but it is important that he/she demonstrably is able to recognise the paramount importance of economic analysis. Some of the ways the study can go wrong are considered in sections 3 to 6. People who do not have a grasp of the underlying economic issues may well misjudge the significance of factors such as food supply and demand, foreign exchange, economic benefits, externalities and linkages. In this connection, also, the team leader should be able to identify, as early as possible, those issues which are not referred to in the terms of reference for consideration within the study.

The team leader must have the authority to win the respect of senior government people, from ministers

downwards. He/she must, therefore, be personable, as well as astute enough to recognise the concerns of the sponsors and government officials. It is also important to win the support of staff in the country's agencies with which the sector study team will be working because much of the information will come from them and their contacts will contribute to the completion of the study.

The team leader should be aware of the importance of presentation. The final report must look attractive and so must be easy to read, well set out, laser-quality printed and well bound. The team leader will also have to make oral presentations to the steering committee during the study and on submission of the draft and final reports.

The team leader should have administrative skills. He/she is responsible for the plan of campaign for the completion of the study within cost, time and specification. He/she must be able to plan, organize, coordinate and control through a systematic procedure for reporting back.

The team leader must be able to communicate. The team should be aware of the overall purposes of the study; the team leader, therefore, will need to keep in close contact with the sponsor, the steering committee and other key personnel. The team leader also needs to be able to translate the overall objectives of the study into individual assignments for team members. In turn, their results must be consistent with the overall objectives.

The team leader also has to be strict about quality control. The standard of contributions by team members should be consistently high.

7.6 Summary – Management of Sector Studies

The above section is summarized in the following points:

- good terms of reference are a basic requirement for a good sector study;
- terms of reference define the responsibilities of all interested parties and should have the agreement of all parties;
- terms of reference should be drafted to enable the sector study team leader to use his/her initiative in determining whether issues not specified in them should be the subject of study;
- strict criteria should be employed in the selection of the consulting company;
- the team leader should have economics expertise to enable him/her to guide the selection of information and the writing of the report;
- high professional, administrative and leadership attributes in the team leader are critical to the success of the study.

8. TOOLS

8.1 Economic

Macroeconomic computer models are normally useful to enable the consultants to estimate the contribution of the fisheries sector to the national or sub-national economy, albeit at a preliminary level. It is also valuable to have a means of predicting the impact of changes to the industry, implying the requirement for a team member who is able to set up the model on a computer. The numbers are useful but will probably not

include many of the external costs and benefits. These must be handled qualitatively; they must not, on any account be ignored.

Industry models for the assessment of the added value of marginal and intra-marginal fishing industry businesses will provide significant insight. In this case, the requirement is for accounting data which can be adapted to generate added value statements. The basic need is for accounts of representative firms and, if possible, marginal firms. However, the sponsors and the team should be aware that such commercially confidential information may be difficult to obtain.

Economists have developed a number of summary measures to describe the impact on economic welfare of various policy measures (summarised in Chapter 2 of Ellis, 1992). For example, there is the effective rate of protection or ERP. This is the ratio of value added, calculated in domestic prices, to value added expressed in world prices. Policies such as import quotas or import tariffs cause the value added in domestic prices to be above the value added in world prices, so the ERP is then greater than 1. Conversely, if domestic prices are suppressed, the ERP falls to less than 1. In general, however, the use of measures such as the ERP is not recommended unless they are specifically required by the sponsor. They are more useful for larger studies of the entire agriculture sector, rather than for the fisheries sector. Reviews of fisheries need to be more closely focused on specific problems of the sector; general ratios do not shed much light on the fundamental problems of the sector.

FAO has developed some user-friendly computer programs for bio-economic analysis (Sparre and Willmann, 1992) which can help to focus research. Experimental values can be put into the model to see what pattern of industry structure emerges. However, the mathematical complexity and data requirements of such models mean that the sector study is more likely to identify those features of the fisheries activities

which might be susceptible to bio-economic analysis, providing advice on where more comprehensive research would be valuable, rather than going into a full bio-economic analysis itself. This feature implies that at least one member of the team should be a trained fisheries economist.

8.2 Socio-economic

The techniques of "rapid rural appraisal" provide a systematic approach to speedy data collection and analysis.

The FAO "Guide for Training in the Formulation of Agricultural and Rural Investment Projects" (Garzia, 1986) provides a summary of the quicker approaches. The approach is essentially relatively informal, relying on interviews and dialogue with key personnel. The Asian Development Bank (1991) has published a comprehensive guide to what it terms "Rapid Social Appraisal", an excellent guide to the main techniques. A guide to rapid rural appraisal for inland waters is provided by Townsley (1992).

8.3 Summary—Tools

A sector study should provide estimates of the contribution of the fisheries sector to the national economy and, where appropriate, of the regional economy.

The consultants should consider developing a model to show the likely effects on the economy of policy changes in the sector.

Estimates of the contribution of the sector to GNP should be qualified, when appropriate, by qualitative assessment of the effects of externalities.

Added value analysis of marginal and intra-marginal enterprises provides considerable insight into the sector.

A sector study team should be aware of the conditions governing the applicability of computer programs for bio-economic analysis and make appropriate recommendations for their use.

At the outset of the planning for a sector study the possible need should be considered for the use of rapid rural appraisal to obtain information and provide an analysis of impacts.

9. CONSULTATION AND DATA COLLECTION

9.1 Consultation

Consultation should be as wide as possible. However, a sector study is not unlimited and a line has to be drawn around this process. Ways of extending the range of consultation which are relatively economical in the time they require (and which are not mutually exclusive) include the following:

- the organization of a seminar, or a series of seminars, around the various issues; for example, it might be relevant to invite some leading academic biologists to a seminar at which they can discuss the various biological topics; similarly, a group of environmental specialists may be encouraged to contribute their research findings in the context of seminar discussions;
- meetings with key industry leaders and other representative persons; these can be valuable but participants have to be selected with care and meetings to be structured.

Increasingly, governments favour concluding a sector study with a national planning workshop, or seminar. Very often, governments use these meetings to sound out the opinion of the different parts of the sector and of other interested parties to the proposals in the draft sector study document. Sometimes, governments may decide to restrict participation in such a meeting to governmental and other public sector institutions. Whatever the participation decided upon by the government, a seminar or workshop gives the team leader the opportunity to present the document to a larger group than it may have been possible to talk with in the course of the study and subsequently to revise the document to take into account the views expressed.

9.2 Information Gaps

One of the functions of a sector study is to identify gaps in relevant information. In many countries, the fisheries sector is relatively well served with factual information. However, data are sometimes lacking.

International trade data are usually available because they are a source of information for tax revenue but statistics may sometimes omit or underestimate any illegal cross-border trade.

Most countries have estimates of catches but statistical systems can sometimes underestimate or overestimate landings of artisanal boats and omit any illegal landings. The collection of statistics on the beaches is very often one of the areas where governments will seek to make financial economies.

Economic data—prices, incomes and opportunity costs are often harder to come by. Private company costs, earnings, profitability and balance sheet information are often difficult to obtain, although it is sometimes possible to infer commercial information from other information which becomes available.

The absence of biological data may sometimes present a problem. Most countries have invested human and financial resources—sometimes through technical cooperation agreements with donor agencies—in fish population research, and the task of the team may be one of bringing together the available information into a coherent single document. Even if the information available presents only a limited picture, it may often be sufficient on which to base sound options for development.

10. THE REPORT

10.1 The Report as a Work of Art

The final report of a sector study is as brief, economical and as readable as possible. It is, perhaps, helpful to think of it as a serious work of art which conveys a truthful picture of the fishing economy. It picks out the key strengths of the industry at the same time as stating those areas where there is potential which remains unfulfilled. It also draws attention to those features of the industry which deduct value from the national economy or generate damage in other ways.

Consultants entrusted with the preparation of a sector study should take care to source their factual information and to highlight the difference between their professional judgement and established facts.

10.2 List of Chapter Headings

The following list of possible section headings for a sector study is not definitive and the material could be organized in other ways.

I. GENERAL

A. Macroeconomic Information

This section should give a clear summary of the current macroeconomic policies of the country. It will include summary information on the following:

- GDP,
- GNP,
- population trends,
- inflation rate,
- balance of payments,
- balance of trade,
- interest rates,
- money supply,
- competition policy,
- *per caput* income and income distribution trends,
- any other relevant policies (such as regional policy, social policy, etc.).

B. The Role of Fisheries in the Economy

Contribution of the fisheries sector to GNP, employment, international trade, *per caput* consumption of animal protein over time, etc. Linkages (6.4) are important in this chapter. Also note 6.19 on foreign exchange and 6.22 on credit.

C. Institutional Framework

A description of the private and public sector institutions involved in fisheries and related industries. The Fisheries Authorities (6.7), Other Institutions (6.8) and Industry Structure (6.14), should be noted. Research (6.11) will also be included here.

II. FISHERIES DEVELOPMENT PROGRAMMES AND POLICIES

This chapter provides a description of government policies towards the fisheries sector, including an assessment of external assistance and financial flows.

An important issue that needs to be investigated under this heading is the consistency of the government's objectives and policies. For example, governments may seek to maximise employment, production and profitability, which are usually incompatible objectives.

Many governments have policy statements which have a relevance to the fisheries sector. For example, in the present climate, policy statements are frequently supportive of private sector development. However, governments, through their fisheries department, may continue to have, and be unwilling to relinquish, a direct involvement in commercial activities. In another example, governments may have a general policy of seeking to maximise economic welfare but be reluctant to adopt specific policies in the fisheries sector which would contribute to this aim, such as adopting measures to limit access to fish resources.

III. THE INDUSTRY—DESCRIPTION

It may be convenient to divide this chapter into discrete areas of activity, e.g.:

- Marine industrial capture fisheries.
- Marine artisanal capture fisheries.
- Inland capture fisheries.
- Coastal aquaculture.
- Inland aquaculture.
- Fish processing.
- Infrastructure.

IV. MARKETS

An analysis of markets is important because understanding and developing markets for fish and fish products is fundamental to the development of the industry.

The objective of this chapter is to assess the current situation and reach a realistic view of what might be attainable. For example, in domestic markets it may be possible to increase the value of fish, as perceived by consumers, by providing hygienic public fish markets. In export markets, it may be possible to increase the valuation of fish through a programme of training in quality management together with credible quality assurance certification.

A possible way in which this chapter might be structured is as follows:

- supply and demand estimates;
- internal markets, market transparency and market failure;
- export markets; a commentary on the reputation of fish and fish products of the country concerned may be relevant.

Relevant sections of the Guide include The Human Resource (6.13), Marketing (6.20) and Hygiene Standards (6.21).

V. RESOURCES

A. Capture Fisheries

Fish resources are the main strategic asset of the fishing industry. Therefore, alongside the biological analysis there should be a review of the access arrangements to the relevant resources and, *inter alia*, a review of the legal and institutional aspects of fisheries management.

B. Aquaculture

The strategic assets for aquaculture include rights to land and water, and to coastal areas for industry activities.

Relevant sections include Fish Resources as Strategic Assets (6.1), Sustainable Development (6.2), Externalities (6.3), Technical Aspects (6.5), Fisheries Authorities (6.7), Other Institutions (6.8), Legislative Framework (6.9), Monitoring and Enforcement of Management Regulations (6.10), and Research (6.11).

VI. INSTITUTIONAL ANALYSIS

A. Internal

In this chapter, the strengths and weaknesses are assessed of institutions in the public and private sectors.

Relationships between the fisheries authorities and other institutions inside and outside the country can be important in enhancing or diminishing the value of the fisheries sector to the country. The analysis should include, therefore, consideration of the influence of the institutions in the fisheries sector on other related institutions, such as in other economic sectors, in water use, and in coastal area management.

Two important concerns are as follows:

- the extent to which the fisheries authorities have the capability to present good quality arguments in support of the industry in negotiation with other government departments and industries;
- the capacity of the fisheries authorities to prepare and implement a fisheries development plan, including a fisheries management plan.

B. External

The study should draw attention to the relationship of the public and private sectors to institutions outside the country.

There may be a number of different external connections to identify. For example, for capture fisheries, access to fishing grounds elsewhere may be important; there may be trans-boundary environmental impacts which affect the sector; foreign fishing industries may be an important source of innovation; access to foreign markets may need to be negotiated; other States may wish to obtain access to the country's EEZ; etc.

Relevant sections of the Guide include Sustainable Development (6.2), Externalities (6.3), Conflicts Between Interest Groups (6.6), Fisheries Authorities (6.7), Other Institutions (6.8), Legislative Framework (6.9), Monitoring and Enforcement of Management Regulations (6.10), Research (6.11), The Human Resource—Distinctive Capabilities (6.13), Industry Structure (6.14), Innovation (6.15), and Privatisation (6.16).

VII. SECTOR ANALYSIS

In this chapter, each subsector of the industry is evaluated as a source of added value for the country concerned.

For each subsector of the industry a clear view must be taken of the benefits it is currently generating and the potential benefits, if any. The analysis might be structured as follows:

- assessment of the strengths of the industry sectors, e.g., a low cost structure, a high quality workforce, record of innovation, access to secure and well-managed fish resources, good quality research, good access for fish farmers to feed, seed, technical support, etc.;
- the extent is assessed to which these assets give the subsectors of the industry present or potential competitive advantages (compared to the industry in other countries);
- a preliminary estimate is made of the value of these advantages to the country; some will be actual, but will need to be sustained; some will be potential and will need to be sought through projects and policies.

Most of the individual parts of section 6 are relevant to this chapter of the sector study.

VIII. SOCIO-ECONOMIC ISSUES

The fundamental issue to be addressed in this chapter is whether any particular community or social group is being

harmed by the development of the sector, with a special focus on the poorer members of the society. Some examples are as follows: in fisheries development, artisanal fishermen can easily become victims of the development of industrial fishing methods; coastal aquaculture development has sometimes been damaging to artisanal fishermen or to small farmers; the creation of a new outlet for fish, e.g., a cannery, may remove fish from the traditional distribution system.

Under this heading, it is also important to identify the impact of fisheries development, and any possible changes of direction, on women.

Note especially Social Issues (6.12), but also Sustainable Development (6.2), Externalities (6.3), Conflicts Between Interest Groups (6.6), The Human Resource—Distinctive Capabilities (6.13), Food Security (6.17), Nutrition (6.18), and Credit (6.22).

IX. ENVIRONMENTAL ISSUES

Fisheries development can be a cause of environmental damage and it can also be the victim of adverse environmental change. In this chapter, more important issues should be identified.

Sections on Sustainable Development (6.2) and Externalities (6.3) are relevant.

X. OPTIONS FOR DEVELOPMENT

Based on the information generated by the study, the beginning of this chapter might be a convenient place to review and propose modifications, if necessary, to the government's expressed goals (national and/or sectoral), and objectives for the sector.

The chapter would then summarize the steps that need to be taken to sustain current benefits and to generate future benefits.

11. REFERENCES

Asian Development Bank. June 1991. Guidelines for Social Analysis of Development Projects.

Baum, W.C. and S.M. Tolbert, 1985. Investing in Development. Oxford University Press. New York.

Checkland, P.B. 1981. Systems Thinking, Systems Practice. Wiley. Chichester.

Checkland, P.B. and J. Scholes, 1990. Soft Systems Methodology in Action. Wiley. Chichester.

Clark, C.W. 1990. Mathematical Bioeconomics. The Optimal Management of Renewable Resources, Second edition. Wiley. New York.

Cornes, R. and T. Sandler. 1986. The Theory of Externalities, Public Goods and Club Goods. Cambridge University Press. Cambridge.

Ellis, F. 1992. Agricultural Policies in Developing Countries. Cambridge University Press. Cambridge.

Flood, R.L. and M.C. Jackson. 1991. Creative Problem Solving. Wiley. Chichester.

Garzia, M., *et al.* 1986. Guide for Training in the Formulation of Agricultural and Rural Investment Projects. FAO. Rome.

- Geddes, M., C. Hastings and W. Briner. 1990. Project Leadership. Gower. Aldershot.
- Grigg, D. 1985. The World Food Problem 1950-1980. Blackwell. Oxford.
- Kay, J. 1993. Foundations of Corporate Success. Oxford University Press. Oxford.
- Mollett, J.A. 1990. Planning for Agricultural Development. 2nd edition. Avebury. Aldershot.
- North, D.C. 1990. Institutions, Institutional Change and Economic Performance. Cambridge University Press. New York.
- Ostergaard, L. (ed.). 1992. Gender in Development, A Practical Guide. Routledge. London and New York.
- Ostrom, E. 1990. Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge University Press. Cambridge.
- Pauly, D. 1990. On Malthusian Overfishing. *NAGA - The ICLARM Quarterly*, 13(1): 3-4.
- Sparre, P.J. and R. Willmann. 1992. Software for bioeconomic analysis of fisheries. BEAM 4 manual. Analytical bioeconomic simulation of space-structured multi-species and multi-fleet fisheries. Volume 1: Description of model. *FAO Computerized Information Series (Fisheries)* No. 3. Vol. 1, 186p. FAO. Rome.
- Timmer, C.P. 1987. Nutrition. *In* Economic Development, pp. 259-63. Eatwell J., M. Milgate and P. Newman (eds), Macmillan. London and Basingstoke.

- Timmer, C.P., W.P. Falcon and S.R. Pearson. 1983. Food Policy Analysis. John Hopkins. Baltimore.
- Townsley, P. 1992. Rapid Appraisal for Small Water Bodies. ALCOM Report No. 11. FAO, Harare, Zimbabwe.
- Turner, J.R. 1993. The Handbook of Project-Based Management. McGraw-Hill. Maidenhead.
- Vuylsteke, C. 1988. Techniques of Privatization of State Owned Enterprises Volume I. Methods and Implementation. World Bank Technical Paper No. 88. The World Bank. Washington, D.C.
- Westring, G. International Procurement: A Training Manual. 1985. The World Bank. Washington, D.C.

APPENDIX

Example of Terms of Reference

A hypothetical terms of reference is reproduced below. As noted, in practice, terms of reference are specific to individual countries and need to be prepared with that country in mind.

The following terms of reference are for a study of a developing country's fisheries sector which has a significant artisanal sub-sector, small industrial fishery in coastal waters, and some inland and coastal aquaculture.

In the following terms of reference, section 1 contains a short *description* of the information which a sponsor might wish to see included. The following sections constitute an *example* of the text of a terms of reference.

TERMS OF REFERENCE

1. INTRODUCTION AND SUMMARY

The purpose of this section is to give a concise picture of the industry and the main issues which the sector study will address.

This section includes a brief description of the sector. This may consist of overview information, such as on the structure of the sector; some selected basic data, such as on fish production in each of the capture and culture sub-sectors, number and sizes of vessels, number and sizes of fish farms; geographical distribution of the sector; employment; main trends in fish consumption; exports and imports; etc.

In this section also, the purpose of the study is described and the main issues identified, as perceived by the sponsors of the study.

2. OVERALL OBJECTIVES

The overall objectives of the study are as follows:

- (a) The study should provide a description of the resources available to the fisheries sector. "Resources" should be understood in the widest sense to include physical assets, people and fish.
- (b) The study should include a critical evaluation of those resources. The purpose of the evaluation is to assess to what extent the current configuration of resources can be used to support the further development of the fishing industry.
- (c) The study should include the formulation of possible outline strategies for the development of those resources.
- (d) The study should include detailed consideration of the artisanal sub-sector, assessing its socio-economic contribution and the means by which its contribution to national economic welfare can be enhanced.

3. DETAILED TASKS

The following list of detailed tasks is a guideline for the consultants covering the main issues as perceived by the Government. It is not a definitive list of topics to be covered by the sector study. In the proposed workplan, the consultants are

invited to comment on the Terms of Reference and make additional suggestions on issues which should be considered.

3.1 Institutional and Legal Aspects

- (a) The study will describe the administrative and legal structure of the fishing industry.
- (b) The study will include a detailed description and analysis of the work of the Fisheries Department and other fisheries authorities. It will describe the relationship between the State, especially the fisheries authorities but also other Government departments, and the industry. The study will also include recommendations on the appropriate structure of the Fisheries Department and on the relationship between the State and the industry.
- (c) The study will review the system of collection and dissemination of fisheries statistics and recommend improvements.
- (d) The study will examine and comment upon laws and regulations affecting the industry. To do this the consultants will need to consult other Ministries and Departments.
- (e) Some issues which the study should cover are as follows:
 - the legal basis for fisheries control and management;
 - labour and employment laws influencing conditions of employment at sea and on shore;

- regulations governing health, hygiene and care of fish on board fishing vessels and fish processing on shore;
- the impact of fisheries development policies and programmes on the income, and nutrition of individuals and groups at risk; in this context the consultants should show awareness of the differential impact of programmes on policies on different genders, and other social and cultural categories.
- the relationships between the Government and the industrial and artisanal sub-sectors of the industry;
- legal and institutional aspects of non-governmental organizations.

3.2 Economic and Marketing Issues

- (a) The study will show the volume and value of fish production for each of the major sub-sectors of the industry over a ten-year period. Values should be expressed in local currency and converted to international values. Volumes and values should be broken down into major species groups and product categories, when possible.
- (b) The study will estimate the contribution of the fishing industry to income and employment, including part-time income and employment, from each of the main components of the industry (industrial fleet, artisanal vessels, artisanal fish processing and distribution, industrial fish processing and distribution, and inland and coastal aquaculture,

respectively). The analysis will also assess the contribution of the industry to income and employment in the localities and/or sub-national regions where it is concentrated. The analysis will take into account secondary income and employment generated through linked activities, such as repairs and maintenance, ice manufacture and the manufacture of packaging materials. It will pay particular attention to the linkages within the subsector and to other fisheries subsectors, as well as linkages to other sectors.

- (c) The study will include a profile of the labour force in the fish industry. This should include all relevant details, insofar as they are readily available. Data for each part of the sector should be broken down by age structure, gender, skill and formal qualifications, casual/contract/permanent conditions of employment and nationality.
- (d) The supply and demand for fish will be estimated. This will include estimates of *per caput* fish consumption and the contribution of fish to average annual *per caput* protein consumption; significant regional differences should be identified; factors influencing demand will be identified. Estimates will be made of demand over the next five and ten years.
- (e) The extent to which the domestic market is transparent will be considered and imperfections in the market identified;
- (f) The physical conditions for the sale of fish through the main distribution channels should be reviewed.

- (g) Export markets will be considered. This will include assessments of the size of markets, distribution channels, conditions of access, quality requirements, packaging, labelling and health requirements, and payment conditions in the main markets.

3.3 Artisanal Subsector

- (a) The artisanal sub-sector of the industry will be described. The description will include an assessment of the economic significance of the sub-sector relative to the industry as a whole.
- (b) The study will assess the socio-economic status of fishing industry communities. In this, it will consider, *inter alia*, community health, nutritional status, access to education, housing, access to potable water, and report on differences in access to social services resulting from differences in social group, such as gender or other socio-cultural category.
- (c) The study will examine the socio-economic consequences for the artisanal sub-sector of current and future developments in the industry. It will assess the present and potential damage to the artisanal sub-sector and related communities from the overfishing of fish stocks harvested by the artisanal sub-sector.
- (d) The study will review the physical infrastructure available to the artisanal sub-sector and make recommendations accordingly.
- (e) The study will examine the availability of inputs used by the artisanal sub-sector.

- (f) The study will assess the role of NGOs in the artisanal sub-sector. It will also comment upon the scope for collective action by artisanal fisherfolk in fisheries management and in any commercial activity.
- (g) The study will review the fish processing and distribution activities carried out in the artisanal sub-sector, having regard particularly to methods of processing and, *inter alia*, the consumption of fuel and post-harvest loss of product.

3.4 Industrial Fishery and Fleet

- (a) The study will develop scenarios for the future of the industrial fleet, including an assessment of both the short and long term outlook for fish stocks;
- (b) The study will describe the institutional and legal constraints applying to the industrial fleet and will note any problems caused by competition for fish resources.
- (c) The study will describe the current industrial fishing fleet. The description will include an assessment of the technical state of the fleet.
- (d) The study will include recommendations on the future size and technical characteristics of the industrial fleet based on estimates of the economically optimum number of vessels. These calculations should be based on estimates of the costs and benefits of fishing operations.
- (e) The study will include recommendations on the steps required to modernise the fleet and to equip it for efficient commercial operations. The study will

include estimates of the cost of such modernisation as may be required.

- (f) Institutional arrangements for the management of the near-water fisheries will be described. The study should include recommendations for any changes, if necessary.
- (g) The consultants will assess the availability of suppliers of inputs to the industrial fishery, such as shipbuilding, repairs and maintenance, supplies of ice, boxes, etc.

3.5 Industrial Fish Processing and Distribution

- (a) The current status of fish processing facilities will be described. The description should include an assessment of freezing and cold storage capacity, energy consumption and potential and actual throughput.
- (b) The study will consider the hygiene and quality control standards in the industry and make any appropriate recommendations regarding their improvement.
- (c) The study will include recommendations for modernisation and new investment in the industrial fish processing industry. The recommendations will be based on an assessment of the costs and benefits of such modernisation.
- (d) The study will consider the scope for the diversification of the fish processing industry for the processing and distribution of other foods.

- (e) The study will assess the scope for further privatisation of the fishing processing industry.

3.6 Aquaculture

- (a) The current status of inland and coastal aquaculture will be described. The description should include an assessment of the area of ponds, areas of marine and brackish water used for aquaculture, productivity, drop-out rate of fish farmers, and output.
- (b) The study will examine the scope for the further development of the inland part of the aquaculture industry. Consideration should be given to ways in which the area of ponds can be increased on agricultural farms by generating net benefits to farmers. In this part of the study, the consultants should take into account, *inter alia*, the present institutional structure, the provision of extension services to fish farmers, the availability of seed, and any need for research and the ways in which such research can be most usefully used. The recommendations will be based on an assessment of the costs and benefits of such development including, *inter alia*, a consideration of the marketing of fish, and should take account of all relevant environmental factors. The recommendations should also take account of quarantine requirements and other precautionary practices.
- (c) The consultants will consider the potential for the development of marine and brackishwater aquaculture.
- (d) The study should comment upon the consequences of aquaculture development on income distribution and other socio-economic variables.

3.7 Fishing Ports and Harbours and Other Infrastructure and Marketable Inputs

- (a) The study will review the capacity and suitability to the fishing industry of fishing ports and harbours, taking into account any other commercial developments at these ports and harbours.
- (b) The study will assess the commercial activities related to fishing currently taking place at the country's fishing ports and harbours. Activities considered will include repairs and maintenance, and shipbuilding.
- (c) The study will make recommendations for the improvement of port and harbour facilities for the industrial fleet and artisanal vessels.

3.8 Fish Transport and Trading

- (a) The study should include an assessment of the current arrangement for transporting fish inside and outside the country.
- (b) The fish trade will be examined with a view to suggesting improvements in the approaches adopted.

3.9 Research Requirements

- (a) The sector study should describe the human resources and existing research facilities related to the fish industry. Relationships between the fisheries authorities and the fisheries research institutions, and between the industry and the research should be reviewed. The research programme of the Department should be assessed. The means

employed by the research institutions to communicate the results of research to interested parties should be reviewed. Recommendations on these issues and research strategy generally should be included in the report.

- (b) As part of the sector study, the consultants should identify possible research partners for fisheries research institutions.

3.10 Training and Education

- (a) The study should include an assessment of the current training and educational facilities for the fish industry, and within fisheries authorities and other institutions. Both internal and external resources should be taken into account.
- (b) The sector study should include recommendations for training.

3.11 Coastal Area Management

- (a) The study will review: (i) the management of coastal areas from the perspective of the fisheries sector including, *inter alia*, the extent to which the fisheries authorities, representatives of the fisheries sector and the fishing communities are consulted in decision-making process and involved in other activities related to coastal area management; and (ii) the institutional arrangements and their efficacy in protecting the rights of coastal fishing communities and their customary practices to the extent which is compatible with sustainable development.

- (b) The study will assess the extent to which Government agencies and other institutions effectively monitor the coastal areas and the marine environment, having particular regard to the effects of environmental changes on the fisheries sector.
- (c) The study will examine the degree to which the fisheries authorities are able to assess the impact of activities outside the fisheries sector on the sector and the environmental impact of activities within the sector.
- (d) The study will assess the present and potential role of the fisheries authorities in mitigating or eliminating adverse environmental impacts on fisheries and the externalities generated by fisheries, including aquaculture, and make recommendations accordingly.
- (e) The study will examine the extent to which the Government has facilitated the adoption of fisheries practices that avoid conflict between fisheries resources users and other users of the coastal area, and by which it has promoted the establishment of procedures and mechanisms at the appropriate levels to deal with conflicts which arise within the fisheries sector and between fisheries resources users and other users of the coastal area.
- (f) The study will examine the extent to which Governmental agencies are cooperating with neighbouring States to facilitate the sustainable use of coastal resources and the conservation of the environment.

4. SUPERVISION ARRANGEMENTS

The study will be conducted under the supervision of the Director of Fisheries. The Director will ensure that the consultants have free access to all information required for the study.

The consultants are requested to nominate a team for the study.

The consultants' team will work with local specialists to be assigned by the Fisheries Department in their areas of expertise.

5. WORKPLAN

Up to nine man/months have been allocated for the completion of the study which will be completed within six months. The consultants will prepare a detailed workplan for the study and nominate an expert as project manager.

6. CONTRACTUAL CONDITIONS

The consultants will provide the services set out in these Terms of Reference. They will assume full responsibility for meeting the Terms of Reference.

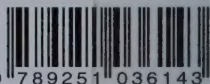
The consultants will be responsible for all costs related to their implementation of the project including fees, per diem, local specialists, international and domestic transport, preparation of reports, etc.

The consultants will present a draft report in English upon completion of the field work. Five copies of the report will be presented in the language of the country and five copies in English within two months of completion of the field work.

This document is intended to provide guidance to governments sponsoring fisheries sector studies, to other organizations that may be concerned in their commissioning and financing and to consultancy organizations and others charged with responsibility for undertaking them. The document suggests that a sector study should assess the material benefits society gains from the fisheries sector and compare these with the human and financial resources employed in the sector. It should then recommend ways in which the balance of advantage to society can be improved.

Although the guide views the fisheries sector primarily as an economic sector, it is recognized that governments may view the sector as a supplier of other public benefits apart from economic well-being. The guide emphasizes that a sector study should consider unpriced environmental effects on the sector, both those originating outside the sector and those generated within it, as well as the environmental impact of fisheries outside the sector. The guide emphasizes that a sector study should be a short and readable document. It provides advice on the presentation of the final report and the preparation of terms of reference. It also advises on the management of sector studies and the selection of consultants. The role of a sector study in the sector planning process is described.

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